MARCH 11, 1961

Chemical Week

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Du Pont acetylene
plan stirs industry
debate on merits
of processp. 21

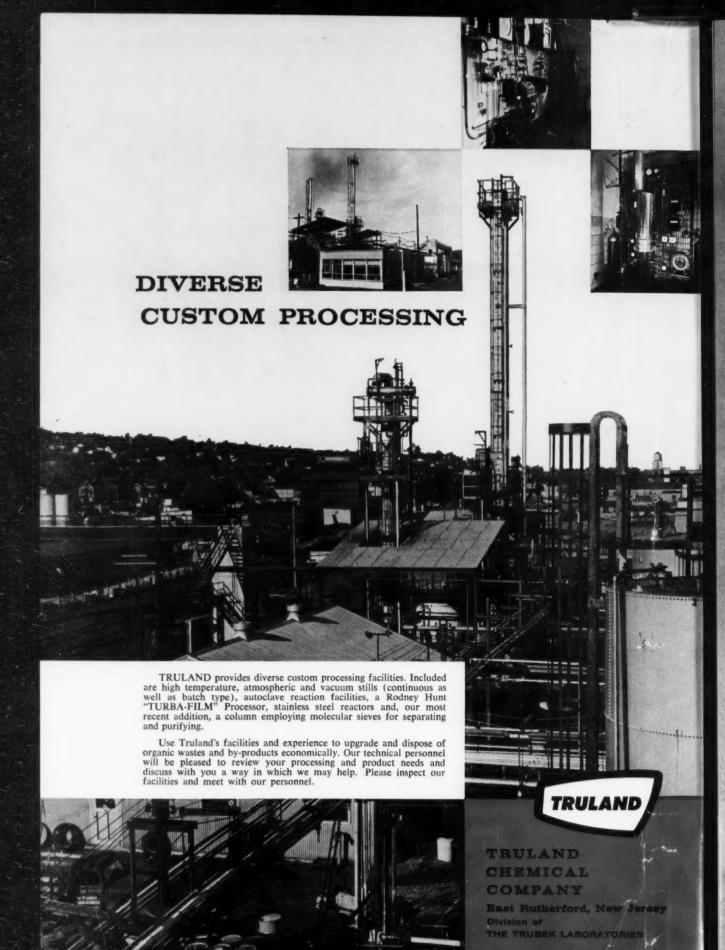
Russian exclusive: how Soviets build their West-designed chemical plants .p. 53

Oxo plant growth continues, but demand is slow to catch upp. 84

Antifreeze outlook: how producers are readying for rugged selling season . p. 87

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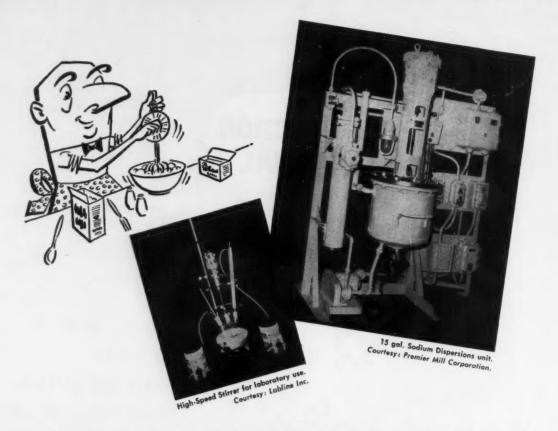
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ON THE COVER: Busy downtown street illustrates the bustle that has made Denver the city favored by specialties makers in the Rocky Mountain area (p. 64).



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Canada's Cloudy Economy

A LOOK AT CANADA'S ECONOMY, taken recently by the McGraw-Hill Dept. of Economics, shows some remarkable similarities to the U.S. situation: sagging business, rising unemployment, lower capital investment, liquidation of inventories, and hope for a spring upturn.

But Canada is not just a carbon copy of the U.S. Abundantly endowed with natural resources rather than technological potential, Canada's best-sellers are raw materials rather than manufactured goods, and its economy is less self-sufficient. To a considerable extent, Canada provides the raw materials for U.S. manufacturers.

Canadians are worried that foreign (mostly U.S.) investors have too much control over their industry. Even in manufacturing, 56% is foreign-controlled, and the percentage is much higher in the resource industries. As a result, the government is endeavoring to stimulate Canadian investment through higher taxes on foreign profits, tax and depreciation concessions to Canadian firms, and protective tariffs. Thus by means of tax policy Finance Minister Donald Fleming hopes to reshape the economy.

Because manufacturing output is no higher than it was in early '57, there has been little incentive to modernize or expand productive facilities. Spending in '60 barely reached the '59 level; it is 22% below the level of four years ago; and there is little hope of a '61 rise.

Foreign producers, particularly the German and Japanese, have gained in world markets through a combination of modern plants, low wages, and high research activity. American producers, under the same competitive pressures, have streamlined their operations and introduced new products, so that last year the U.S. was almost the only country in the world to achieve a significant increase in export of manufactured goods. But Canadian manufacturers were at a disadvantage because they had no backlog of technological improvements to introduce.

U.S. investors also lost interest: Half of U.S. firms' foreign investments this year will go to Western Europe-double the proportion that went there in '57; in contrast, only 18% will go to Canada, compared with 40% in '57 and even higher proportions before that.

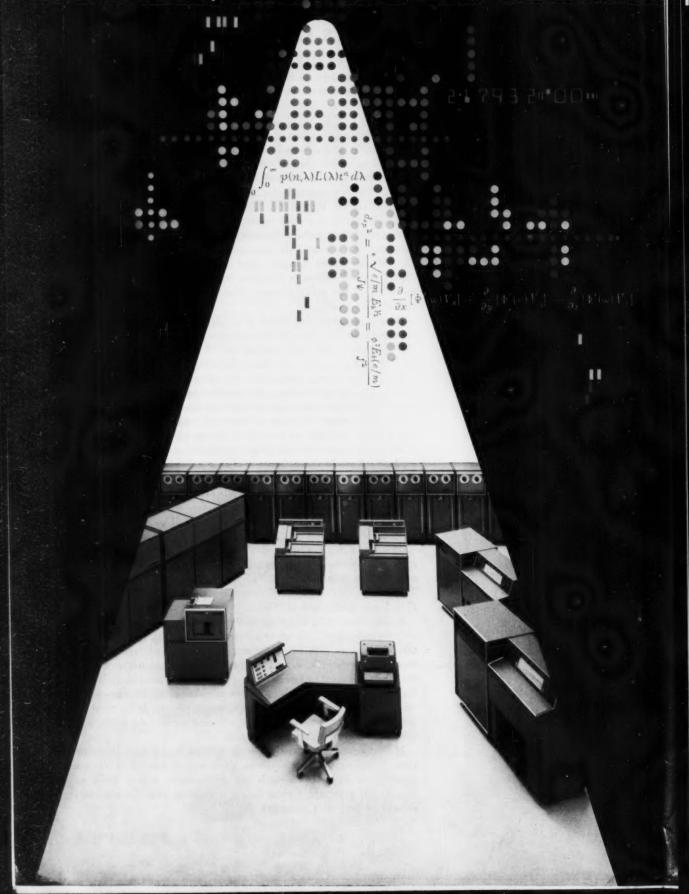
This is not to say that Canada's exports have been falling; on the contrary, they rose 8% last year. But a large increase in raw-materials exports more than offset a decline in exports of manufactured goods. This partly explains why employment in durable goods manufacture is 12% lower than it was in '57.

Unless a new wave of strong, worldwide demand develops, Canada's economy will show little growth before midyear. Its trumps are the natural resources with which the economy is generously endowed, but there is relatively little demand for these materials when neither Canada nor the U.S. is growing rapidly. Unless the Canadian government is willing to sit out the slump, it will have to take strong measures-both through regulation and spending-to stimulate industry. It has taken the first steps in this direction, but so far it has not pursued this policy with sufficient vigor to assure prompt results.

Massive government spending, in our opinion, is of dubious long-term value in solving Canada's problems. Steps to gain control of its own economy, to encourage research and development, and to build up manufacturing toward a more balanced economy offer Canada more promise of long-term prosperity.

BURROUGHS CORPORATION ANNOUNCES

THE B 5000, WHICH SETS NEW STANDARDS



IN PROBLEM SOLVING & DATA PROCESSING

The new Burroughs B 5000 Information Processing System is a decided departure from conventional computer concepts. It is a problem-oriented system. Its markedly different logic and language are in large part dictated by the characteristics of ALGOL and COBOL. And it incorporates a complete set of operating, monitoring and service routines.

Additional operational features include an average add execution time of three microseconds, and a memory cycle time of six microseconds. Both character- and word-oriented, the B 5000 operates in binary and alphanumeric modes; a single set of arithmetic commands operates interchangeably on both fixed-point and floating-point numbers.

More important than these features is the fact that they combine with compiler-oriented logic and language to provide a new concept in computing—an integrated hardware-software system which sets:

NEW STANDARDS OF PROGRAMMING EFFICIENCY

Incorporating logic and language designed to take advantage of modern compiler techniques, the B 5000 permits straightforward, efficient translation of common-language source programs. And it brings a new high in compilation speeds—20 to 50 times faster than those possible on conventional computer systems.

NEW STANDARDS OF AUTOMATIC OPERATION

A Master Control Program, incorporating the automatic operating, monitoring and service routines, is pre-stored on a fast-access drum. It automatically schedules work according to pre-assigned priorities; allocates memory and input/output assignments; and maintains maximum-efficiency use of all components through a comprehensive interrupt system. As a result, human intervention is minimized, system efficiency maximized.

NEW STANDARDS OF PROGRAM-INDEPENDENT MODULARITY

Availability of multiple, functionally independent modules provides the B 5000 with excellent system flexibility and expansibility. The system may include one or two independent processors; up to eight core memory modules with a total capacity of 32,768 48-bit words; and one or two fast-access bulk storage drums, each with a capacity of 32,768 words. Up to four independent input/output channels control a maximum of 26 input/output units, including up to 16 standard-format magnetic tape units. Additional input/output units include card punch and reader, two types of printer, plotter and keyboard.

NEW STANDARDS OF EFFECTIVE MULTI- AND PARALLEL PROCESSING

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NEW STANDARDS OF SYSTEM COMMUNICATION

The new B 5000 permits simultaneous on-line/off-line operation. It features completely flexible communication among all of its units. A central processor communicates with all memory units. Any input/output channel communicates with any peripheral equipment and any memory module.

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ASHLAND OIL & REFINING COMPANY

ASHLAND, KENTUCKY

Pellets in Europe

To the Editor: You referred (Oct. 8, '60, p. 91) to the forthcoming commercial debut of a prill form of a delayed-action rubber accelerator manufactured by the United States Rubber Co.'s Naugatuck Chemical Division, inferring that it was the first time this rubber chemical had been specially formulated for easy, dustfree handling.

As a point of interest, Monsanto Chemicals Ltd. first sold the wellknown Monsanto rubber accelerator, Santocure, in the form of pellets in 1953. The method of pelleting used was developed in our research laboratories in the United Kingdom specifically to improve handling and reduce dust formation.

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J. W. BARRETT Monsanto Chemicals Ltd. London, England

Replace Football?

To THE EDITOR: On your editorial "Hire Men Who Can Write" (Feb. 4, p. 5): Amen. Courses in writing, and by no means only technical writing, should be compulsory for all graduates of technical colleges. Even if it has to be at the expense of football practice.

WILLIAM H. SACHS 1440 Lanier Place, N.E. Atlanta 6, Ga.

Selective Tariff Approach

To THE EDITOR: A sound tariff policy is needed, as indicated in your Feb. 11 Viewpoint. But the problem is, What is a sound tariff policy?

Is it where one branch of the government permits "across-the-board" proposals for reduction in U.S. duties, as in the case of sections of the list of products now being considered at the GATT negotiations . . . while on the other hand, another branch of the government is buying pirated pharmaceuticals abroad, as in the case

of the Veterans Administration?

A sound tariff policy, in my opinion, must be developed from an intimate understanding of industry's problems and contributions to our economy, tempered with a selective approach to tariff levels.

> H. GOELER 17 Calt Drive Hazlet, N.J.

MEETINGS

National Assn. of Corrosion Engineers, annual conference, Statler Hotel, Buffalo, N.Y., March 13-17.

Synthetic Organic Chemical Manufacturers Assn., luncheon meeting, Hotel Roosevelt, New York City, March 14.

American Society of Tool and Manufacturing Engineers and Society of Plastics Engineers, meeting, "Plastics for Tooling Meeting," Statler-Hilton Hotel, Detroit, March 15.

Commercial Chemical Development Assn., Hotel Roosevelt, New York City, March 15-16.

Textile Research Institute, annual meeting, Commodore Hotel, New York City, March 16-17.

Western Metal Congress and Exposition (12th), Ambassador Hotel and Pan-Pacific Auditorium, Los Angeles, March

Instrument Society of America, instrument-automation conference, Armory, Washington, D.C., March 20-23.

American Chemical Society, national meeting, St. Louis, Mo., March 21-30.

American Institute of Chemical Engineers, Chicago section, symposium; themes: new developments for chemical processing, new developments for the engineer and management; Conrad Hilton Hotel, Chicago, March 22.

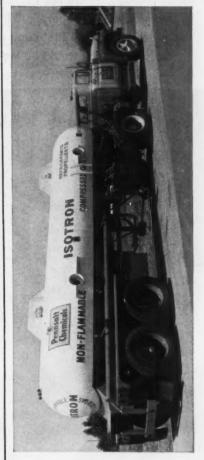
American Institute of Chemical Engineers, New Jersey section, spring lecture series, topic: "The Statistical Design and Interpretation of Experiments"; research auditorium of Union Carbide Plastics Co., River Road (State Route 18), Bound Brook, N.J., March 30, April 6, 13, 20,

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.



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CHEMICAL ISOLATION

NEW AND HIGHLY EFFECTIVE chemical

isolation methods have been developed through ion exchange chromatography. The two processes presented here are notable not only for their high resolving power but also for their low cost of operation. In both of these processes, the fact that no chemical regenerant is needed means that each may be profitably employed where ordinary ion exchange methods would be impractical.



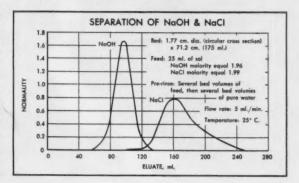
ION RETARDATION

ION RETARDATION OFFERS LOWER COST IONIC SEPARATIONS

Ion retardation is a process based on an entirely new and unique class of ion exchange resins. These are amphoteric (bifunctional) resins containing both anion and cation adsorption sites. These sites have an attraction for each other, but will also associate with mobile anions and cations in solution. However, when these mobile ions are adsorbed, they may be eluted simply by rinsing with water. Since ion retardation eliminates the cost of chemical regenerants, it may be profitably employed where ion exchange is impractical, especially where high concentrations of ions are involved. Though applicable to ionic-ionic separations such as the purification of water soluble organic compounds contaminated with salts, ion retardation is especially unique in its ability to make clean fractionations of ionic-nonionic mixtures. The chart shows an excellent separation of strong electrolytes using Retardion® 11A8, a Dow ion retardation resin.

Since ion retardation is based on the reversible adsorption of electrolytes, good separations of ions from very large organic molecules may be obtained. Retardion 11A8 resin, made by polymerizing acrylic acid inside Dowex® 1 (a Dow strong base

quarternary-ammonium resin), has an essentially neutral character which makes it particularly useful for the processing of pH-sensitive compounds. For a specific analysis of the applicability of ion retardation to your processing operation, write to Dow at Midland.



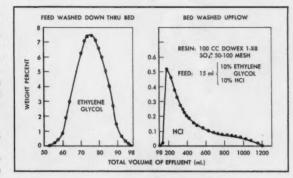
ANION SULFATE PROCESS

EQUILIBRIUM PHENOMENON OFFERS NEW METHOD FOR REMOVING STRONG ACIDS FROM SOLUTIONS

Another highly capable ion exchange process which requires no chemical regenerant (except water) is known as the "anion sulfate technique." The process may be used for the separation of strong acids from weak acids, from water soluble organic materials, and from certain salts. The unique new method is based on the fact that the sulfate form of a quaternaryammonium anion exchange resin, such as Dowex 21K resin, possesses the acid-adsorbing properties of a weakly basic exchange resin. The equilibrium composition of this resin in a solution of sulfuric acid is a function of the acid concentration. If the solution is dilute, the resin shifts to the sulfate form; if concentrated, to the bisulfate form. Hence the quaternary ammonium anion exchange resins will adsorb acids from concentrated solutions, and the acid may be removed by eluting the column with water (an infinitely dilute acid) which converts the resin back to the sulfate form.

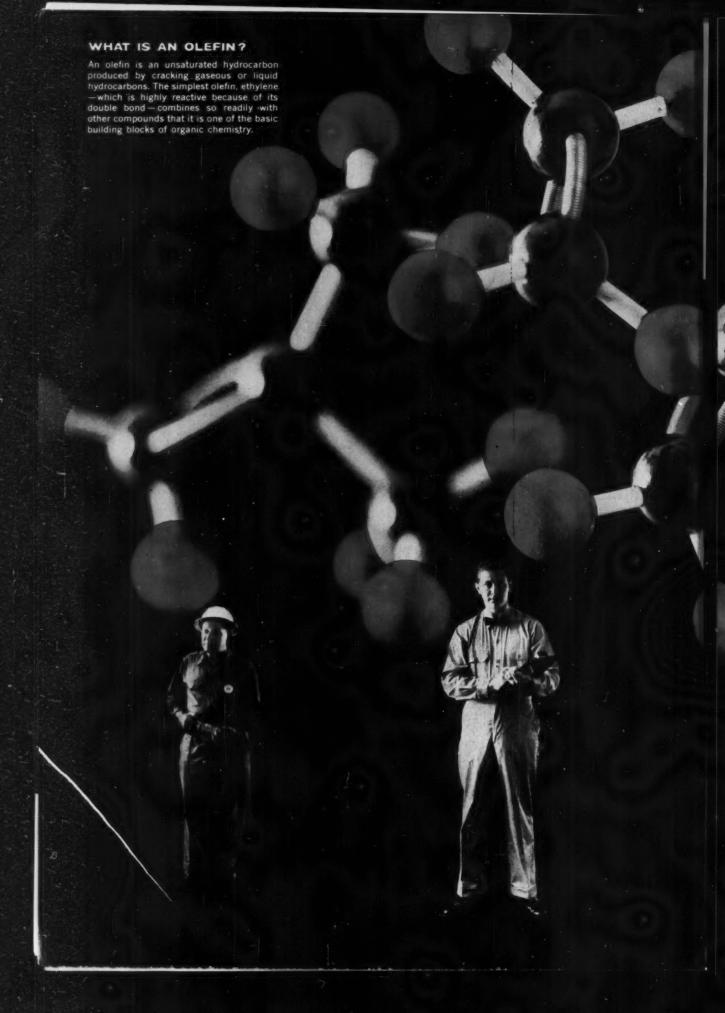
Any strong acid may be removed by this process, not just sulfuric. With HCl, for example, the Cl-displaces SO₄= from the first resin particles it contacts and is therefore preceded by a sulfuric acid band in which the conditions are

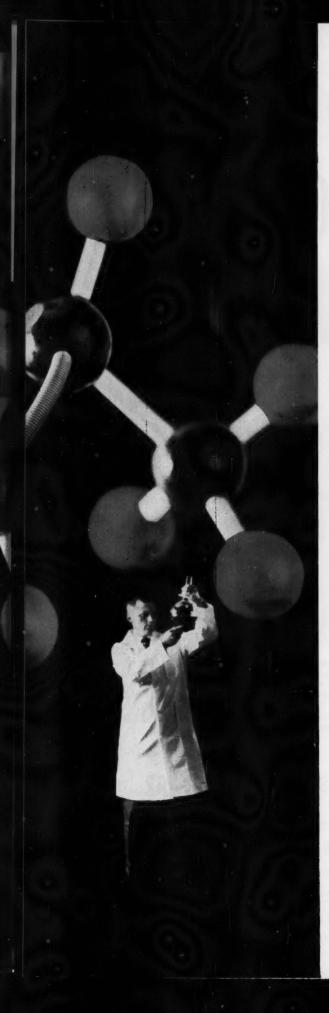
identical with those above. The bed is regenerated to the sulfate form by reversing the direction of the water wash. An example is shown in graph form. For further information, mail coupon or write, stating your problems to THE DOW CHEMICAL COMPANY, Midland, Michigan.



The Dow Chemical Compa	any, Midland,	Mich., Chen	nicals Merch. Dept. 439AM 3-11.
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SERVICE...

THAT MEETS A NEED TO KNOW

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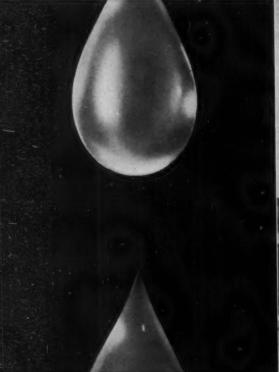
Olefins Company specialists can provide information on properties and performance . . . delivery . . . handling and storage. For example, an Olefins Company program can make acetylene available by pipeline—within an area near any one of 10 plant sites.

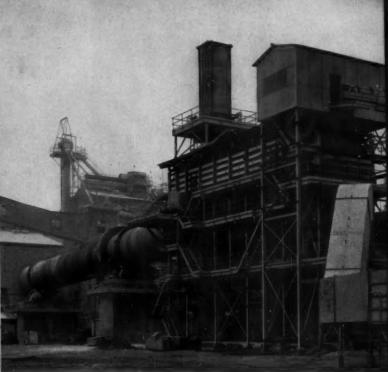
Whether your interest is in olefins or in non-olefins, such as calcium carbide, lime hydrate, or quicklime, you can obtain complete details by writing to Union Carbide Olefins Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York,

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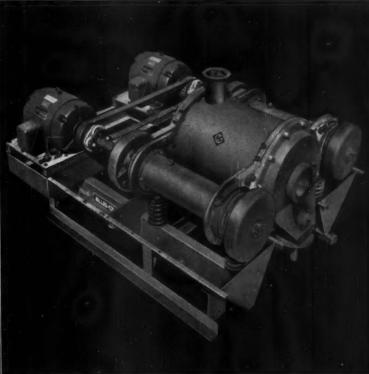
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JEFFERSON CHEMICALS



Business

Newsletter

CHEMICAL WEEK March 11, 1961 More evidence that chemical investments are rising: This week the government's quarterly survey of plans of U.S. business for expenditures on new plant and equipment indicates that chemical companies now are heading toward a prospective record total of \$1.73 billion and such outlays this year—thus reinforcing the findings of the Manufacturing Chemists' Assn. (p. 23). One year ago the government survey showed chemical companies moving toward a \$1.4-billion spending total in '60; and the new survey puts last year's actual spending for chemical facilities at \$1.59 billion.

Current outlook on other process industries' capital budgets for '61, compared with actual totals for '60: products of petroleum and coal, up from \$2.64 billion in '60 to \$2.83 billion in '61; paper and allied products, down from \$750 million in '60 to \$690 million; rubber, unchanged at \$240 million; primary nonferrous metals, unchanged at \$310 million; stone, clay and glass products down from \$620 million to \$540 million. Over-all, investments in all industries appear to be in for a 3% dip, to \$34.57 billion.

Much of this year's buildup will be in petrochemicals.

El Paso Natural Gas and Rexall Drug and Chemical are going ahead on their joint polyolefins venture. Rexall has just raised most of its portion of initial capital requirements (p. 26); and this summer, El Paso will start building a natural gas processing unit at Jal, N.M., to provide raw materials for the main plants to be built at Odessa, Tex. Daily capacity of the Jal unit: ethane, 5,600 bbls.; propane, 7,000 bbls.; butane, 1,320 bbls.

Canada's government-owned Polymer Corp. (Sarnia, Ont.) is adding a polybutadiene project to the synthetic rubber expansion program it adopted last fall (providing new units for making butyl rubber, specialty rubbers, and SBR-carbon black masterbatch). The new project—covered by licenses from Goodrich-Gulf Chemicals and Germany's Karl Ziegler—will be "sufficiently flexible" to produce up to 20,000 tons/year of either polybutadiene or other stereospecific rubbers such as polyisoprene.

American Cyanamid won a clean sweep in the alkyd resin case against Ellis-Foster Co. (CW, Feb. 25, p. 23). In his final judgment on the case, Federal District Judge Thomas Meaney ruled that Cyanamid's 25-year-old license is worldwide. The order is not expected to affect the U.S. alkyd resin industry, but it means that Cyanamid and its customers can continue to do business in Germany even though Ellis-Foster had granted licenses to several German concerns. Ellis-Foster now has 30 days in which to appeal the judgment.

Mead Johnson's new Edward Dalton Division has a second product to accompany its smash-hit Metrecal (CW, Jan. 14, p. 66; Sept. 24,

Business

Newsletter

(Continued)

'60, p. 59). Called Nutrament, the newcomer product is a liquid nutritional mix aimed at busy people who aren't concerned over calories. It's described as a convenience food, equivalent in nutritional value to a meal, which can be substituted for a regular meal or used as a between-meal snack. Each 12½-oz. can of vanilla- or chocolate-flavored drink contains 400 calories (compared with Metrecal's 225), retails for 39¢. Nutrament will be sold in supermarkets and drugstores.

Stepan is reconsidering going into tetraethyl lead and tetramethyl lead production (CW, Feb. 4, p. 21). Reason: reports that Nalco Chemical Co. (Chicago) is pilot-planting a new TEL-TML process that's said to make a less-expensive product. The process is said to be "an adaptation of a process proposed before in the industry." Stepan says it will study the new process, decide within three to five weeks whether it will go ahead. Nalco is reportedly still making cost estimates, has not yet made major construction plans.

Eight Florida phosphate companies will step up land reclamation under a new industry-wide community relations program adopted this week. Individual companies — e.g., American Cyanamid and Davison Chemical Division of W. R. Grace — have carried out a number of reclamation projects over the years. But this is the first time all the companies operating in Polk and Hillsborough counties have joined in attacking the problem. The policy statement, presented at the annual meeting of the Florida Phosphate Council in Lakeland, notes: "The influx of population has created a need for land, not only for housing and industry but also to replace that removed from agricultural and recreational uses by expanding communities and continuing mining activities."

New fertilizer capacity is springing up around the world:

- A \$96-million project to produce fertilizer materials at Aruba, off the coast of Venezuela, is being set up by Aruba Chemical Industries N.V. Big international companies are being invited to participate.
- A \$39-million contract has been awarded to Morrison-Knudsen International Constructors (Boise, Ida.) to build a 100,000-metric tons/year urea plant for the Indonesian government at Palembang, Sumatra.
- India has confirmed that California Chemical, International Minerals & Chemical, and Parry & Co. will build a \$55-million, 350,000-tons/year fertilizer plant in India (CW Business Newsletter, March 4).
- Also in India, Chemical Construction Corp. (New York) will build a \$30-million, 90,000-tons/year fertilizer plant near Bombay. It will be government-owned.

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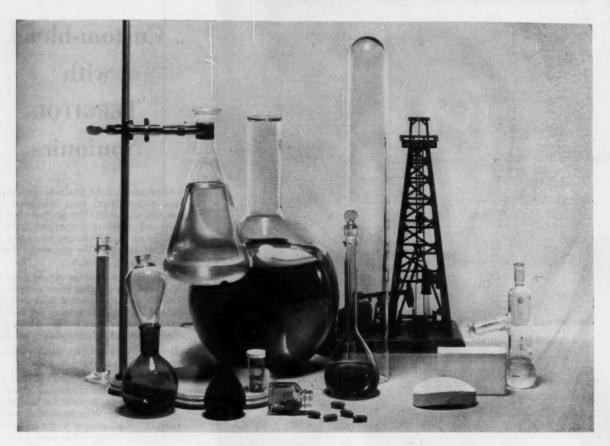
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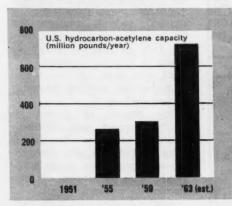
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Chemical Week March 11, 1961

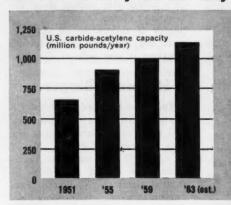
Hydrocarbon-acetylene is in its biggest expansion surge . . .





Union Carbide's pioneer acetylene-from-natural-gas plant at Texas City, Tex.

But carbide-acetylene will stay ahead, share future growth.





Union Carbide's big acetylene-from-calcium-carbide plant at Ashtabula, Ohio.

New Odds on Acetylene Outlook

The acetylene outlook for the '60s is taking on a different hue this week as management scrutinizes the implications of Du Pont's decision to build an acetylene-from-hydrocarbons unit to supply the needs of its neoprene plant at Montague, Mich. (CW Business Newsletter, March 4).

Coming on top of three other major hydrocarbon-acetylene projects—by Diamond Alkali, Monochem (Borden Chemical and U.S. Rubber), and Tenneco (Tennessee Gas Transmission and Cary Chemical)—the Du Pont move emphasizes that hydrocarbon-acetylene is now enjoying a field day. U.S. capacity is coming within shouting distance of that of

carbide-acetylene for the first time (charts, above). In addition, at least two other companies—Dow and Reichhold—are working on possible hydrocarbon-acetylene projects for the Texas Gulf Coast.

Nevertheless, acetylene specialists still feel that calcium carbide will continue to be the basis for most of the acetylene to be produced in the U.S.; and that carbide-derived acetylene will not be displaced from its present outlets.

World Significance: But in Du Pont's decision to produce its own acetylene in Michigan, where electric power is not cheap, industry experts see evidence that there have been important improvements in electricarc technology—possibly enough to justify the much-overused term, "breakthrough." (Du Pont says it has been investigating low-cost routes to acetylene for the past 25 years, has developed its own version of the arc technique and has applied for patents on it.)

Accordingly, these specialists say, such processes may now make hydro-carbon-acetylene entirely feasible in many areas that do not have either low-cost electric power or locally produced natural gas. This, of course, would apply to many parts of Europe as well as to various parts of the U.S.

In the U.S., however, the present

feeling is that there will be relatively little new capacity for acetylene of either type during the next few years (CW Acetylene Report, March 26, '60, p. 45).

Other Arc Route: If Du Pont's new Michigan project is successful, it will mean that there are at least two good electric-arc processes for hydrocarbon-derived acetylene. The other: a process employed by Chemische Werke Huels in West Germany.

The Huels process formerly was regarded as too costly for most markets, chiefly because of its big requirement for electric energy (CW, May 18, '57, pp. 112-116). But U.S.

experts now speak highly of the Huels plant, whose capacity is now estimated at fully 200 million lbs./year and whose efficiency has been substantially increased.

Du Pont apparently has found a way to slash power requirements. One acetylene authority estimates that Du Pont's process will require about 3.5 kwh. of electrical energy per pound of acetylene produced, compared with about 4.5 kwh. needed to produce the equivalent amount of calcium carbide.

One element of mystery in Du Pont's project: plans call for no by-product recovery. This is in sharp contrast with other hydrocarbon-acetylene projects, which include sizeable units for recovery of either ammonia or methanol.

Another question mark in the Michigan situation is Union Carbide's apparent optimism about its acetylene-from-carbide sales outlook there. The company's Olefins Division apparently intends to tighten up on operating costs and find new outlets for the acetylene it now sells to Du Pont.

DIMENSION-



Where Acetylene Technologies Meet

Du Pont says it has not decided which feedstock it will use in the acetylene plant it plans to build at Montague, Mich. Du Pont says it can use almost any low-cost hydrocarbon. Natural gas—probably the preferred feedstock—is piped into the Montague area by Michigan-Wisconsin Pipeline Co., whose supply comes mainly from the Texas Panhandle. Production of natural gas in Michigan is increasing but is still very small, relative to the state's consumption.

Worth noting: more than 50% of Michigan's '59 natural gas production came from the Overisel field, not quite 50 miles from Montague. That field's '59 output was considerably more than Du Pont would need to produce 50 million lbs. of acetylene. Other natural gas fields are scattered throughout south-central Michigan, and the area has many oil wells.

Refinery gases and other possible feedstocks might be obtained from two petroleum refineries in Muskegon, which get the bulk of their crude oil by pipeline from the Chicago-Hammond area. Union Carbide's acetylene plant in Montague gets its calcium carbide from Sault Ste. Marie—some 300 miles away by water.

T-H Thinks Bigger

Thompson-Hayward Chemical Co. (Kansas City, Mo.)—a distributor that has long inveighed against bigness in business (CW, Jan. 26, '57, p. 42)—will next week become affiliated with one of the world's industrial giants: N. V. Philips Gloeilampenfabrieken, Netherlands-based international electronics and pharmaceutical company.

Consolidated Electronics Industries Corp. (New York)—a 36%-owned Philips subsidiary—has purchased T-H, will use it to expand its pharmaceutical, animal nutrition and other chemical operations in the U.S.

The Kansas City distributor had already moved beyond the small-company stage. (With \$32-million annual sales, plus \$5 million in commissions, T-H is now the U.S.'s third-largest chemical distributor.) But it found it was at an awkward stage, and could move ahead only by linking up with a firm that could provide capital for expansion. T-H is now in the midst of a \$4-million expansion.

Consolidated will center its chemical operations at St. Joseph, Mo., where it has the Anchor Serum Co., maker of veterinary pharmaceuticals.

New Mineral Hunt

Kern County Land Co. (San Francisco)—with '60 sales of \$97 million and primary interests in oil and gas properties—is ready to break into the chemical industry with an aggressive mineral development program in the Intermountain area of the West.

Three years ago the San Francisco firm discovered large colemanite deposits on the Mojave Desert, but the dominance of U.S. Borax & Chemical's sodium borate deposits has kept Kern County from developing its find (CW Business Newsletter, Feb. 22, '58).

This week Kern is on the move again. Possible acquisition of a Utah potash producer, exploration for trona in Wyoming, and prospecting for rock phosphate on the Idaho-Wyoming border are its three newest interests.

Kern County has offered to acquire Bonneville Ltd., a solar-evaporation potash producer in Wendover, Utah, with '60 sales of \$1 million and 755,000 acres of property. Negotiations between Kern and Bonneville have stalled—temporarily, at least—because of disagreement on terms of acquisition. George G. Montgomery, chairman of Kern, offered a stock exchange of 11 shares of Bonneville for one share of KCL, but Quincy A. Shaw, Bonneville's president, wants a ratio of six to one.

Joining the growing hunt for trona deposits, Kern County is conducting coring operations on its Green River, Wyo., property. W. T. Griswold, manager of exploration, has confirmed that Kern had completed drilling of several core holes in the southwestern Wyoming trona belt. Primary objective: to determine structure and reserves of the deposits.

And to round out the immediate program, KCL is completing prospecting in the Raymond Canyon area (on the Idaho-Wyoming border) for phosphate rock reserves. The Homestake Mining Co. developed this area during World War II for a government vanadium project. Griswold says Kern County's main interest is phosphate, not vanadium.

KCL does not expect to go it alone in any of these developments. According to Griswold, Kern County is now discussing partnership possibilities with various firms.

Upswing in Construction Outlays Chemical industry construction budget totals, in millions of dollars. Source: MCA Annual Construction Surveys, 1957-61.							
Category		1957	'58	'59	'60	'61	
PLANTS	For new projects	702.4	699.8	436.7	452.9	733.2	
	Projects under construction	1,744.6	1,767.3	994.6	1,045.5	1,640.8	
	Projects completed in previous year	1,118.7	1,271.1	1,705.4	1,282.7	940.1	
LABS	For new projects	15.6	8.1	27.4	36.6	39.2	
	Projects under construction	37.3	67.9	59.6	126.3	96.6	
	Projects completed in previous year	42.4	31.2	70.1	61.6	101.1	

Building for the Upturn

Sharply increased spending for new chemical plants and laboratories in the U.S. is in the cards for '61, despite the general downturn in business and the apparent overcapacity in various major chemical commodities that has led to a depressing of prices and profits.

Funds allotted for new projects to be started this year are up 59.1% (vs. '60's allocations), to \$772.4 million, according to the Manufacturing Chemists' Assn.'s annual construction survey (CW Business Newsletter, March 4). Cost of projects under construction at the time of the survey was up 48.2%, to \$1,737.4 million.

Over-all, total value of all projects covered in the survey—including those completed in '60—is \$3.55 billion. It's the second-highest total since MCA began conducting these surveys; highest was the \$3.84 billion aggregate in '58.

Lab Investments Up: While many chemical companies stretched out their plant construction programs during recent years because of recessions and overcapacity, there was a general agreement that more and better research was needed to speed the finding of new and more-profitable products and more-efficient processes.

These two parallel trends last year resulted in the unprecedented completion of laboratory projects valued at more than \$100 million—not quite 10% of the value of all chemical industry projects completed during '60 (table, above).

Growth in chemical laboratory construction appears to be continuing. There's a record appropriation of \$39.2 million for new lab projects this year—up nearly fivefold from the '58 allocation.

Boom in Organics: Figures for the various product categories are not strictly comparable to those of previous MCA surveys because this year there is no separate category for petrochemical projects. But by any standard, there's a boom in new plants for general organic chemicals. Funds for new starts are up more than threefold, to \$407.6 million, and value of projects under construction is up nearly 60%, to \$514.7 million. Value of projects completed in '60 was \$339.5 million—a gain of nearly 45%.

Other significant increases in '61 budgets: fertilizer chemicals, new starts up more than threefold, to \$99.9 million, and value of plants under construction up nearly 80%, to \$78.6 million; inorganic chemicals,

new starts up more than double, to \$128.9 million, and plants under construction up more than 15%, to \$296.6 million; metals, new starts up nearly double, to \$13.6 million, and plants under construction up more than 70%, to \$26.9 million.

As usual, Texas ranks first among the states in value of chemical construction projects; but this year it ranks first by a greater-than-usual margin. Money for new starts in Texas is up more than threefold, to \$261.4 million, and value of projects under way in that state is up 73%, to \$459 million. Louisiana ranks second (new starts, \$79.4 million; under way, \$108.8 million), and California moved up to third (new starts, \$91.9 million; under way, \$33.5 million). Next in line: Ohio, Pennsylvania, New Jersey, Tennessee, Florida, Kentucky, Michigan.

Regional totals showed West South Central states (including Texas) first with \$1,163 million, followed by South Atlantic (\$616 million), Middle Atlantic (\$455 million), East North Central (\$422 million), East South Central (\$359 million), Pacific (\$223 million), Mountain (\$101 million), West North Central (\$93 million), and New England (\$53 million).

Double Offering

The federal government is offering for sale two large plants in chemicalproducing areas.

(1) At South Charleston, W. Va., in the Kanawha Valley, the General Services Administration will open bidding (March 31) on a 197-acre tract containing a former Navy ordnance plant.

(2) In southern Arkansas, near Camden, GSA offers a 64,000-acre domain that was assembled in '44 as the Shumaker Naval Ammunition Depot. The area is parceled into eight tracts, one of which (6,000 acres) contains industrial buildings, utility systems and railroad yards; another (501 acres) contains housing and recreational facilities. Sealed bids will be opened April 4.

The government is still debating whether to accept Deuterium Corp.'s bargain-hunting bid of \$1.5 million for the big plant at Morgantown, W. Va. (CW Business Newsletter, Feb. 25). The plant cost the government \$64 million.

More On-Site Oxygen

Air Reduction Sales Co. (New York) will build a \$5-million air-separation plant at Claymont, Del., primarily to serve SunOlin Chemical Co.'s new ethylene and ethylene oxide units.

The latter are scheduled to begin production later this year.

Total plant capacity will be more than 350 tons/day of oxygen and an initial 25 tons/day of high-purity nitrogen. The new plant will follow what Airco calls its "over-the-fence concept" of marketing: instead of having just one customer—like most on-site separation units—it will sell to a number of customers in the area. At the outset Airco will pipe about 120 tons/day of oxygen to SunOlin.

In this kind of marketing, Airco sees a number of advantages, especially for the principal customer. Chief benefits: flexibility in changing product requirements, and no need to tie up a capital investment.

Contracts for building the plant and the 600-ton emergency storage facilities have not yet been awarded, but Airco engineers are investigating the site for best installation possibilities. This will be the first air-separation plant Airco has built exclusively for supplying petrochemical producers.

Smaller Sales Target

John Deere Chemical Co. (Pryor, Okla.) is planning to hit a smaller market harder.

Up to now, the fertilizer division of tractor-making Deere and Co. (Moline, Ill.) has sold its ammonia and urea output west of the Appalachians. (The John Decre plant at Pryor has a capacity of 200 tons/day of ammonia, 300 tons/day of urea.)

Now Deere has bought the mixed fertilizer business of the Ozark-Mahoning Co. (Tulsa), plans to sell urea and ammonia only through O-M outlets in Kansas, Iowa, Nebraska, Missouri, Arkansas, southern Minnesota and South Dakota.

The deal includes O-M's 70,000-tons/year ammonium phosphate and phosphoric acid plant at Tulsa, and O-M's distribution setup.







Celanese's Kennedy, KixMiller, Brooks: Heirs apparent to the presidency?

New Lineup for Celanese's Top Team

In moves that are certain to excite speculation about the line of succession, Celanese this week: (1) appointed one additional executive vice-president; (2) realigned the major functions of the two previously appointed executive vice-presidents; and (3) revealed the resignation of Kenneth C. Loughlin, 56, president of Celanese since last April. Under the new arrangement, Board Chairman Harold Blancke takes on the additional position of president.

Assuming new responsibilities:

John W. Brooks, 43, Celanese executive since '55, will be executive vice-president in charge of domestic operations.

Richard W. KixMiller, 40, takes charge of international operations. A Princeton graduate, he joined Celanese in '46.

James R. Kennedy, 49, holds the new post of vice-president in charge of corporate financial planning and administration.

ICI Moves into Euromart

With a bridge between Britain and the European Common Market apparently still far distant, Imperial Chemical Industries has decided to bolster its position in the booming six-nation market by launching a massive capital investment program there.

Last week the British chemical giant revealed it planned to spend \$280 million during the next 10 years building plants in the Common Market, and that negotiations are "well advanced" for a 300-acre site near Rotterdam, where it intends to build a plant to make petrochemicals, "including plastics and related products."

Construction is expected to start early next year if negotiations are successful, and ICI intends to build smaller-scale units elsewhere in the Common Market.

ICI divisions involved in building the Rotterdam plant are believed to be Plastics, Paints, General Chemicals, and Heavy Organic Chemicals. The new plant is expected to be similar to ICI's \$336-million complex at Wilton, Yorkshire, which makes ethylene, propylene oxide, polyethylene, polypropylene, polyester fibers (Terylene); and can also produce ethylene glycol and ethylene oxide.

Moving with the Market: ICI has been making plans for large-scale manufacturing operations within the Common Market since July, when it set up a council to study the situation and make recommendations. The council has now been established as an operating board charged with supervising ICI's operations in all of Western Europe, including both the Common Market and the Free Trade Assn.

The decision to move into the Common Market, says ICI, "reflects the company's intention to pursue a vigorous drive for chemical business in Western Europe." This area has always been an important market for ICI products. Last year the Western European market — principally, the Common Market countries—accounted for a quarter of all ICI exports.

Although ICI has more than 20 small subsidiaries in various parts of Europe, the Rotterdam project would be its first major manufacturing venture on the Continent.

The company denies, however, that the decision was made on the assumption that Europe's two trading blocs would not merge. Spokesmen point out that chemical consumption in Western Europe is five times as great as in Britain and growing twice as fast. The firm stresses that building plants on the Continent does not mean it will relax its efforts to boost exports from the U.K., which in '59 totaled \$245 million.

ICI's decision could trigger a switch in the British chemical industry's approach to the Common Market. Unlike their U.S. counterparts, British companies have been in no rush to invest in Continental plants. British betting has been that sooner or later Britain would link up with the Common Market; and that when it did, it would continue to compete in the Continental market from plants in the U.K. (see p. 27).

U.A.R. Gets Its Plant

The United Arab Republic has finally pinned Russia down on its four-year-old pledge to build a basic antibiotic plant in Egypt. After long negotiations with the Russians on the size and scope of the project, the U.A.R. government revealed last week that the deal was final, and that it had formed the Nasr Pharmaceutical Chemicals Co. to build the \$8-million government-owned plant.

The \$1.4-million civil engineering contract has already been awarded to a local company.

According to U.A.R. Industry Minister Aziz Sidki, the plant will produce penicillin, streptomycin, chloramphenicol, sulfa drugs, saccharine, calcium gluconate, glucose, salicylates, and vitamins. It will be designed, Sidki says, for future expansion into newer types of antibiotics and to make maximum use of local raw materials. It's slated for completion in July '62, will employ 1,000.

Under the First Five Year Industrialization Plan, the plant was to cost nearly \$12 million, with the Russians supplying the equipment, worth more than \$7 million. Western industry observers at the time criticized the plans as providing for production of outdated antibiotics, while the rest of

the world had gone into the production of broad-spectrum antibiotics.

Under the new plans, Russia will supply on a 12-year loan all the equipment, worth \$5 million, install and initially operate it, and train 68 Egyptian engineers in various drug plants in the Soviet Union. The plant will go up on a 60-acre site at Abu Zaabal, northeast of Cairo.

Farbwerke Hoechst, Pfizer, and a group of three Swiss firms—Ciba, Wander, and Sandoz—are all building antibiotic packaging plants in Egypt with local partners. And Wyeth has just won U.A.R. government approval to put up a compounding and packaging plant for making hormones, 18 pharmaceuticals (including antibiotics) and powdered milk.

While there is room for several small antibiotic compounding plants in the Egyptian market, one basic fermentation plant could supply all of the country's needs for whatever it produces, one U.S. executive notes. Exports to neighboring markets will probably provide part of the answer. And Pfizer points out that none of the products it plans to make in Egypt will be made in the Russian built plant.

The plant reportedly will save the country \$1.3 million/year in foreign exchange. In '59, Egypt imported some \$2.3 million in pharmaceuticals and medicinals.

Italian-Soviet Deal

The Soviet Union and Italy have signed a protocol calling for a mutual trade flow of \$120-150 million this year. This is 20-50% over '60 levels. They also drafted a four-year trade pact to be signed this month.

Under the '61 pact, Italy's exports to Russia will include over 12,000 tons of synthetic rubber, 4,000 tons of rayon and synthetic fiber, 1 million meters of synthetic textiles, and plants for making tires, artificial fibers, acetylene and ethylene from natural gas, titanium dioxide, nylon, and ammonia.

Italy's purchases will include 4 million tons of crude oil, including 2.7 million tons contracted for by ENI, the government oil agency. This will give the Soviet Union 14% of the Italian crude import market. Russia will also send Italy 700,000 tons of fuel oil and 40,000 tons of cellulose.

national roundup

Rounding out the week's domestic news.

Companies

Borden Chemical Co. Division of The Borden Co. (New York) is acquiring Hawley-Monk Co. (Cincinnati) to round out the ink-products line of its Commercial Ink & Lacquer Co. division. Hawley-Monk (plants in Cincinnati, Baltimore, Los Angeles and Kalamazoo, Mich.) produces inks, varnishes and related materials for graphic arts.

Central Soya Co. (Ft. Wayne, Ind.) plans to exercise the option it holds to purchase the Chemurgy Division of The Glidden Co. (Cleveland), when the former's three-year operating lease expires Aug. 31. Price: \$8.55 million. Glidden's Chemurgy Division—with properties at Chicago, Lockport and Seneca, Ill., and Indianapolis, Ind.—produces lecithin, industrial and edible flours and other soybean products.

Rexall Drug and Chemical Co. (Los Angeles) has sold \$35 million worth of 20-year notes to a group of insurance companies, including Aetna and John Hancock. Reason: to provide most of Rexall's share of the financing for the company's joint petrochemical venture with El Paso Natural Gas (CW Business Newsletter, May 7, '60).

Expansion

Thorium, Alloys: Vitro Corp.'s Chemical Division (Chattanooga, Tenn.) will expand its metallurgical operations to include production of high-purity thorium and rare-earth master alloys. These operations will be conducted in two buildings on a 4-acre tract, which, together with equipment, are being purchased from the government. This property, adjacent to the company's existing plant, is the first part of the former Cramet titanium plant to be sold for industrial use. The \$26-million plant has been idle more than three years.

Polymers, Chemicals: Thiokol Chemical (Trenton, N.J.) says it will turn out a new line of polymers and chemicals at its Moss Point, Miss., plant with an addition due onstream this spring. The new unit will occupy 10 acres next to the 25-acre site of the existing plant, which has been producing liquid polysulfide fuels and sealants since '52. Land not yet in use on the company's Moss Point tract: 565 acres.

Polyurethane: Pittsburgh Corning Corp. (Pittsburgh)
—jointly owned by Corning Glass Works and Pitts-

burgh Plate Glass—will enter the foamed-plastics field. Its product: rigid slabs of polyurethane foam, tradenamed Foamthane. Intended use: in thermal insulating applications, such as refrigerators and refrigerated trucks. Principal products up to now have been glass block and cellular glass insulation.

Paper: International Paper Co.'s Southern Kraft Division (Mobile, Ala.) is undertaking a \$3.5-million improvement and expansion program at its Moss Point, Miss., mill. The new buildings and equipment are to be in operation by early next year.

foreign roundup

Rounding out the week's international news.

Trade/U.K.: Britain hopes to boost chemical exports to Poland by 40%; the new optimism follows Polish trade mission visits to Imperial Chemical Industries, Monsanto Ltd., Shell, Distillers, and others. A number of deals were signed, some calling for substantial price cuts. The Poles are interested chiefly in dyestuffs and plastics, and also in wide range of other products, including titanium oxide and heavy chemicals. British chemical exports to Poland in '60 totaled \$4.11 million.

Concessions/India: India's new national budget for '61-'62 includes these significant concessions to incoming foreign capital: tax reductions on new bonus issues and royalties; uniformity of dividend taxes derived from intercorporate investments; and a three-year tax holiday for foreign technicians. But the new plant development tax rebate has been cut from 25% to 20%.

Acrylic Fibers U.K.: (1) Chemstrand Ltd. plans to boost capacity of its Coleraine, Northern Ireland, Acrilan acrylic fiber plant by 50% (to 25 million lbs./year) by the end of '62; (2) Courtaulds already has an expansion in the works to boost capacity of its acrylic fiber, Courtelle, to 32 million lbs./year.

Titanium/Germany: These developments in Germany mark titanium production efforts:

• Pigment-Chemie GmbH., joint subsidiary of Sachtleben AG., für Bergbau und Chemische Industrie and Du Pont, has pushed back to early '62 the starting date of its new 18,000-tons/year plant in Hamburg. Construction started early this year.

• Titan-Gesellschaft, biggest German titanium producer and a 100% subsidiary of National Lead, expects to push capacity from 70,000 tons up to 80,000 tons/year by year's end.

• Farbenfabriken Bayer's production has almost reached 50,000 tons/year.

Chairman Sir Graham Hayman is taking big Distillers Co. Ltd. deeper into chemicals. In his plans: more overseas production.



Thinking Big in British Chemicals

The twin pressures of burgeoning markets and international competition are reshaping Britain's chemical industry. Small companies are scurrying in search of stronger financial backing, and large raw-materials producers are eyeing paths that will bring them closer to consumer markets. Result: a succession of mergers. The pattern is thrown into bright focus this week by stockholders' approval of The Distillers Co. Ltd.'s \$36-million bid to acquire British Xylonite Co. Ltd.

After years of carefully avoiding competition with its customers, DCL will gain a solid footing in end-product manufacture through ownership of one of the U.K.'s largest plastics fabricators. It's the latest step in DCL's phenomenal postwar growth. The world's largest whisky distiller is now second only to Imperial Chemical Industries among U.K. chemical concerns, and probably the biggest U.K. marketer of petrochemicals.

In its immediate implications, DCL's acquisition has a logic of its own. For one thing, it removes a curious anomaly: through a 49.99% interest in British Xylonite's largest operating subsidiary, B. X. Plastics Ltd., DCL has long had the largest single stake in the parent company—but not control of B. X. Plastics, nor any voting rights in British Xylonite.

In addition, the acquisition gives

DCL a laboratory for application research in plastics. British Xylonite's two other manufacturing divisions—Halex and Cascelloid—plus its subsidiaries and associates, cover just about the full range of plastics end-products.

Pattern of Growth: In its broader implications, the merger fits DCL's post-World War II growth pattern. The odds are high that DCL will move further toward vertical integration. Likely new ventures: butadiene rubber and synthetic fibers, for both of which DCL is a major raw-material supplier but not a producer. Worth noting: DCL's history of joint ventures with U.S. and Canadian companies, linking DCL raw materials with the more advanced petrochemical know-how from this side of the Atlantic. (The exception to this pattern is Orobis, a joint venture with Oronite Division of California Chemical Co. Orobis was formed because Oronite wanted a U.K. partner, knew DCL from joint participation in Grange chemicals.)

What's certain is that DCL's chemical business is in a stage of bounding growth.

A major part of this growth is occurring in DCL's subsidiary, British Hydrocarbon Chemicals Ltd., which it owns 50-50 with British Petroleum. Last year BHC brought onstream its third ethylene plant (largest outside the U.S.), doubling the company's ethylene capacity, and a \$11.2-million cumene-phenol plant. Due for completion this year: doubling of butadiene capacity, a new methanol plant, and an ethylene dichloride plant.

By the end of '60, BHC had spent some \$100 million on its Grange-mouth works. Now it's starting work on another complex near British Petroleum's refinery at Llandarcy, Wales. The location was chosen for its nearness to DCL's Plastic Division plants at Barry. Cost of servicing customers in southern England is another factor that entered into site selection. The plant will be onstream in time to serve a new styrene monomer plant of Forth Chemicals (a DCL-Monsanto Ltd. subsidiary), due to start production in '62.

Other projects: a new acetic acid plant at Hull, substantial enlargement of British Geon's PVC, Distrene's polystyrene, and Hedon Chemicals' vinyl acetate capacity.

Wagging the Dog: Founded on DCL's know-how in fermentation and distillation, the chemical side of the business has been steadily growing in importance. Just how much of DCL's total sales—\$650 million in fiscal '59-'60 — are contributed by chemicals is a company secret. Last year's annual report reveals only that the Industrial Group—which includes the Chemical, Plastics and Biochemi-

From whisky to plastics: Distillers Co.

cals divisions, and the smaller Food Division—accounted for some 20% of the company's \$92-million gross profits. (The divisions handle sales of subsidiaries as well as their own plants.)

A good guess for total sales of the three CPI divisions is \$175 million—four or five times the level just after the war. Industrial Group earnings rose a solid 27% in the fiscal year ending March 31, '60.

DCL's industrial tail doesn't yet wag the dog, but the time may not be far off when it does. Significantly, present Chairman Sir Graham Hayman (a past chairman of the Assn. of British Chemical Manufacturers and the Federation of British Industries) is the first DCL chairman to come from the Industrial Group. He took office in '58. And the Industrial Group has equal representation with Potables on the management committee that collectively fills the role of DCL managing director.

Tighter Competition: Like most British chemical companies, DCL has been cutting prices during the past year or two. In part this reflects the economies of larger output due to expanded capacity and greater home demand. But it also reflects the pressure of heavier competition from abroad-U.S., Canada, Japan and the Continent. Behind the protection of high tariff walls, British chemical prices have tended to be higher than those of some foreign competition. In some cases, this has been due to higher raw-material costs, but it also reflects higher profit margins and some outdated plants.

DCL doesn't expect the competition to ease, particularly with the lowering of tariffs within the European Free Trade Assn. It's aiming capital expenditures not only at expansion but also at plant modernization and adoption of more economic processes.

Pushing Research: Research is getting a hard push. Although it doesn't hesitate to seek outside know-how, DCL is relying more heavily on its own labs, spends close to \$6 million/year on research. Out of the central research laboratory at Great Burgh have come a number of processes and process improvements, some extensively licensed abroad. One example is the cumene-phenol process

developed jointly with Hercules Powder Co. in '50, now being used at DCL's Grangemouth plant and a number of plants in other countries. Its process for making acetic acid by direct hydrocarbon conversion will be used in the new \$5.6-million plant at Hull. And the lab has produced an acrylonitrile process (via propylene and ammonia), which DCL has licensed to the French company, Ugilor. The acrylonitrile process has not seen service in a commercial plant.

DCL's large engineering division designs complete plants, as well as plant improvements, specialized equipment, and instrumentation. A number of the engineering development section's devices—e.g., oxygen meters, infrared analyzers, special-purpose pumps—are manufactured and sold under license by equipment firms.

Among the new fields DCL is studying: water-based paint resins; new lines like sorbic acid, isoniazid, picolines. And the Biochemicals Division is attempting to branch out from its traditional large-scale fermentation products; it is working on drugs (some, like isoniazid, are already on the market), and semisynthetic antibiotics.

DCL prides itself on its ability to adapt to changing market conditions. Example: the way the Plastics Division has come through the relative slackness in some sections of the U.K. plastics industry, which was hit by the recession in the appliance and motor industries.

Early last year, when the home market was still booming, DCL saw the portents, stepped up its export efforts, developed new applications for the home market—packaging applications, for instance, to compensate for the drop in polystyrene demand for refrigerators. As a result, DCL's plastic plants have continued at full-capacity production.

Early last year, the Industrial Group established a new Development Department to coordinate long-range thinking on new markets, new products, new lines of research. Typifying DCL's increasing emphasis on its own research efforts, the new department is headed by H. M. Stanley, former manager of the Great Burgh labs.

Boost for Exports: Mainly because many of its products are simple inter-

mediates with high freight costs, DCL's exports have been a relatively minor part of sales.

The Chemical Division exports about 10-15% of its own output, and 20%-30% of the products it handles for BHC. Biggest-volume export items: cumene, butadiene, phenol, acetone. Western Europe — particularly France, Germany, Holland, the Scandinavian countries—is the chief market, but smaller amounts go behind the Iron Curtain—to Russia, Czechoslovakia—and to other parts of the world, including the U.S. (which buys dyestuff intermediates).

The Plastics Division has a bigger relative stake in exports: 20-25% of its direct sales. Because of high tariffs and local competition, little of this goes to the Common Market. Major markets are Scandinavia, the Far East and Australasia, the Middle East and Africa, and South America.

But DCL is becoming increasingly export conscious. Its salesmen are working harder on present markets, developing new ones. The Plastics Division, for instance, is currently giving special attention to West Africa and the Middle East.

Like most British chemical companies, DCL is less than wildly enthusiastic about EFTA. The British industry feels it is losing in protection more than it gains in markets. Nevertheless, DCL intends to make what it can out of EFTA, and is stepping up its sales efforts within the area, particularly the Scandinavian countries.

A major disappointment in the export field has been the U.K.'s failure to link up with the Common Market. So far, DCL says, the Six-Seven split hasn't cost it any trade, but if the split persists a loss is inevitable.

Right now, DCL has no plants or links (other than licensing) within the EEC. Its policy is still based on the belief that some sort of British tie-up with the Common Market is inevitable, and that locating plants on the basis of the split would be uneconomic.

Overseas Production: DCL will probably build up its manufacturing position outside of the Common Market. So far it has chemical production interests in just two countries—Australia and South Africa.

Its Australian affiliate, C.S.R.

Ltd. has climbed to second place in British chemicals.



Stately building on London's St. James Square is headquarters of DCL's Industrial Group.



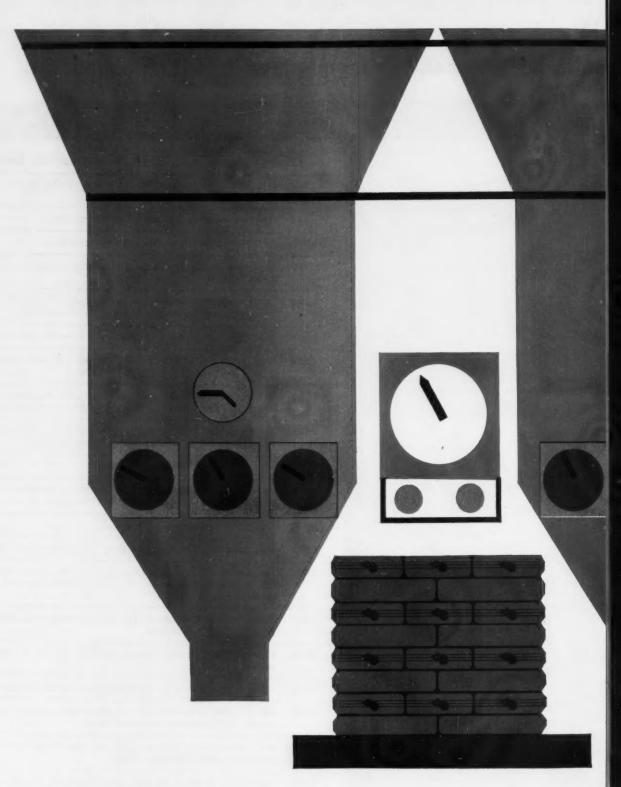
Grangemouth works half owned by DCL is U.K.'s biggest petrochemical complex.



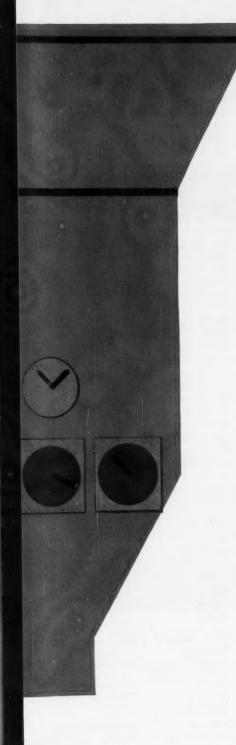
Fast growing Hull works is DCL's original chemical complex, produces a range of chemicals.

Key Steps in Distillers' Chemical Growth

- 1877 DCL formed by amalgamation of several whisky distillers. By-product industrial alcohol sales part of business.
- 1925 Purchases plant at Carshalton to make solvents.
- 1926 Establishes central research and development.
- 1928 Forms The Carbon Dioxide Co. to develop industrial uses of by-product carbon dioxide.
- 1929 Forms British Industrial Solvents Ltd., builds new plant at Hull. Begins researching petrochemicals as substitute solvent source.
- 1937 Buys British Resin Products Ltd., synthetic resins producer.
- 1939 Acquires 49.9% interest in B.X. Plastics Ltd., subsidiary of British Xylonite, one of U.K.'s largest fabricators.
- 1940 With help of Shawinigan Chemicals Ltd., builds and operates for government U.K.'s first calcium carbide plant. (Now leases from government.)
- 1941 Associates with F. A. Hughes and Co., producer of celluloid synthetic resins and molding powders. (Buys Hughes in 1951.)
- 1944 Builds penicillin plant for government.
- 1945 Forms British Geon Ltd. with B. F. Goodrich Chemical Co. (55%-45%) to make PVC from calcium carbide and chlorine.
- 1946 Acquires full ownership of Hughes.
- 1947 Buys penicillin plant, forms Distillers Co. (Biochemicals) Ltd.
- 1947 Forms British Hydrocarbon Chemicals Ltd. with British Petroleum (50-50), to build U.K.'s largest purely petrochemical complex at Grangemouth, Scotland.
- 1950 BHC forms Forth Chemicals Ltd. with Monsanto Ltd. (66%%-33%%) to make monomeric styrene.
- 1954 Forms Orobis Ltd. with Oronite Chemical (50-50) to make lubricant additives.
- 1954 Forms Distrene Ltd. with Dow (55%-45%) to make polystyrene.
- 1955 Forms Hedon Chemicals Ltd. with Shawinigan (50-50) to make vinyl acetate from acetylene and acetic acid.
- 1955 BHC forms Grange Chemicals Ltd. with Oronite Chemical Co. (66%%-33%%) to make detergent alkylate.
- 1956 Forms Honeywill-Atlas Ltd. with Atlas Powder Co. (50-50) to make surface-active agents for emulsions, creams, pharmaceuticals, agricultural sprays.



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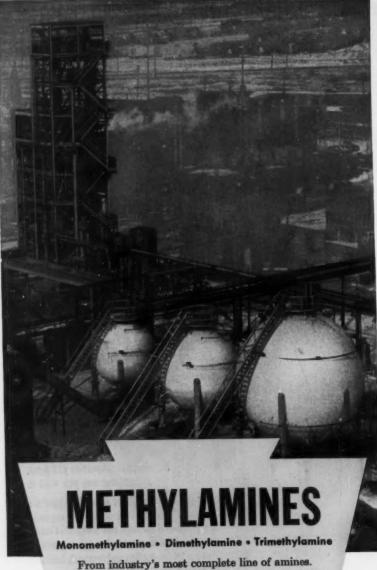
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INTERNATIONAL

Chemicals (60%-owned by Colonial Sugar Refining Co.), produces most of the products DCL makes at Hull, is now getting into petrochemicals. A joint company with Goodrich is building a PVC plant, and one with Dow started producing styrene, chlorine, and ethylene dichloride last year.

In South Africa, National Chemical Products Ltd. (48%-owned by DCL, the rest publicly held) also makes a wide range of Chemical Division products from molasses. With the government-owned South African Coal, Oil and Gas Corp., NCPL formed a subsidiary in '59 to manufacture derivatives from the parent companies' raw materials. And NCPL has another subsidiary—Poly-Resin Products Ltd.

In the past, DCL has tended to license processes in markets to which exporting was unprofitable. Now it's leaning more to overseas production.

DCL is optimistic, though the future is not entirely unclouded. A continuing recession in the U.S. could foreshadow some rough weather for the British chemical and plastics industry, both in terms of a reduced U.S. market and the resulting scramble for overseas markets by U.S. companies. There is also concern over the impact that ICI's and Shell's polypropylene will have on plastics sales.

Major Chemical Products of DCL and Affiliates

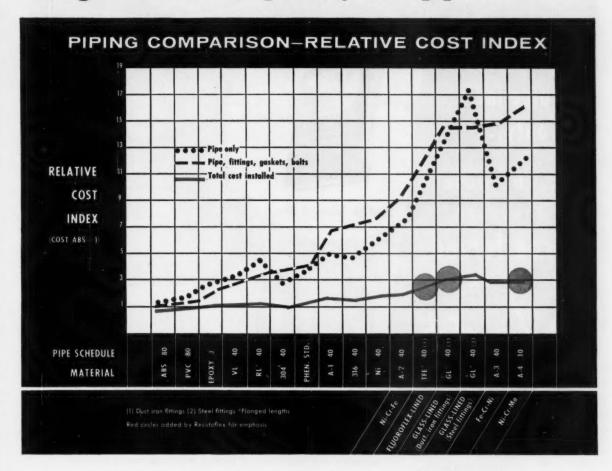
Acetate solvents Acetic acid Acetic anhydride Alkylbenzene Acetone Antibiotics Binder resins Butadiene Butanol Calcium carbide Carbon dioxide Caustic soda Celluloid Chlorine Cumene Detergent alkylate Drug intermediates Dyestuff intermediates Ethanol Ethylene Ethylene dichloride Fine chemicals

Hydrochloric acid

Isopropanol Lube oil additives Molding powders Phenol Plasticizers. adipate, sebacate. phthalate Polyethylene Polystyrene Polyvinyl chloride Propylene Sodium hypochlorite Specialty synthetic rubbers Styrene Surface-active agents Surface-coating resins Vinyl acetate Vitamins

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Washington

Newsletter

CHEMICAL WEEK March 11, 1961 The furor over the effectiveness of the Salk antipolio vaccine is headed for a Congressional investigation. Rep. Kenneth A. Roberts (D., Ala.), chairman of the House Interstate and Foreign Commerce Subcommittee on Health and Safety, wants the entire matter aired "so that the people of this country may be assured as to the effectiveness of the Salk vaccine."

Roberts urges a quick, thorough investigation to be held well in advance of the polio season. The latest charges originated with Dr. Herbert Ratner, health commissioner of Oak Park, Ill., and a long-time critic of the Salk vaccine.

Ratner wrote a letter that appeared in the Journal of the American Medical Assn., stating that "it is now generally recognized that much of the Salk vaccine used in the U.S. has been worthless."

Some press accounts leaped to the conclusion that the letter expressed the view of AMA. However, Dr. F. J. L. Blasingame, executive vice-president of AMA, quickly denied this. He said that the initial press account in the Scripps-Howard newspapers was "a sensational story."

He cited a December resolution of the AMA House of Delegates stating that the vaccine has been "proved to be effective" and urging its "widest possible use" this year in the absence of general availability of oral vaccine.

U. S. Surgeon General Dr. Luther L. Terry also denounced the "erroneous interpretation" in news accounts of Dr. Ratner's views. He defended the vaccine's potency and effectiveness, and stated, "The results have been highly successful among vaccinated segments of the population."

Dr. Salk comments that it is not vaccine failure, but failure to use the vaccine, that results in outbreaks of polio. Roberts plans to call witnesses from all interested agencies of the government, as well as members of AMA.

Funds to start the helium conservation program have been held up in Congress. Interior Secretary Stewart L. Udall backed President Eisenhower's request for \$12 million to get the new program off to a quick start. The House Appropriations Committee, however, wanted more time for study of the program, so several months will elapse before the Interior Dept. actually has funds in hands.

Counterfeit drugs are next on the Kefauver inquiry list. Sen. Estes Kefauver (D., Tenn.), chairman of the Senate Antimonopoly sub-

Washington

Newsletter

(Continued)

committee, will open up soon on charges that there are widespread sales of drugs which are not what they are supposed to be, or are substandard. He will probably hold two or three days of hearings, starting March 21 with Food & Drug Administration officials.

Of more significance to the drug industry, however, is legislation that Kefauver and subcommittee staff members have in preparation. (Introduction of the measure is still some way off.) The bill is likely to include provisions concerning the advertising, licensing and patenting of drugs, and may call for strengthening the drug policing powers of the Food & Drug Administration.

The subcommittee right now is completing the investigative stage of its inquiry into drug prices. Only one further hearing is scheduled; Kefauver will invite doctors and the American Medical Assn. to testify, but probably not until after his measure is in final form.

Subcommittee staff men maintain Kefauver does not want to bring drug prices directly under federal control. Rather, he believes prices can be brought down by revising advertising practices in the industry, perhaps by promoting cross-licensing between manufacturers and other indirect means.

Approval of the Food & Drug Administration's recommendations to extend the March 5 deadline for complying with the Food Additives Act of 1958 has been given by the House Interstate and Foreign Commerce Committee. George P. Larrick, FDA commissioner, asked Congress to give the Administration power to extend compliance provisions in specific cases—not a blanket extension. He told the committee that FDA would grant extensions only for products sold before Jan. 1, '58, and "only where conditions exist which necessitate the prescribing of an additional period." Extensions will not go beyond June 30, '64.

Congress passed the law in Sept. '58, and originally allowed 30 months for food processors to test additives to make sure they were safe for consumption. The extension, provided for in H.R. 3980, is necessary, Larrick said, because "the problem is much larger than anyone realized in '58."

The Justice Dept. has dropped its eight-year-old antitrust action against four leading soap manufacturers—Procter & Gamble Co., Colgate-Palmolive Co., Lever Bros., and the Assn. of American Soap and Glycerine Producers, Inc. An attorney for the Antitrust Division said no purpose would be served by bringing the case to trial.

When the original complaint was filed Dec. 11, '52, it charged a conspiracy in restraint of trade and joint monopolization in the household soap and synthetic detergent industry. Since then, it was pointed out, there has been a great acceleration of the industry's change from soap to synthetic detergents, and a determination of the legal issues involved could not result in a decree that would now have any significance.

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Barge navigates on Mississippi near new Vicksburg industrial site.

Waterways Lure CPI Anew

Although the usually placid Mississippi River (above) is rampaging at flood level this week, this isn't dampening the enthusiasm of developers of the river's newest planned industrial site—245 flood-free acres wrung from the marshes at Vicksburg, Warren County, Miss. Called the Vicksburg Harbor Project, it will eventually include 1,500 acres, cost an estimated \$5 million.

Like industrial waterside developments in other parts of the country, the new site attests to the rising demand for easy access to cheap water transportation, a need particularly evident among chemical manufacturers (see table, p. 40).

Traffic managers don't have to see proof that the Mississippi, or practically any other major waterway, for that matter, is a desirable location for plant sites. They haven't much choice if the transportation cost of raw materials or products is critical or if an abundant water supply is needed. Barge cost for transporting bulk materials (e.g., phosphates) from New Orleans to Chicago, for example, may run about \$4/ton. By railroad, the cost might be \$7-8/ton. A similar difference in loading and unloading costs frequently compounds the advantage of water transportation.

According to the American Waterways Operators, Inc. (Washington, D.C.), 82 new plant facilities were constructed or planned along navigable inland waterways during the fourth quarter of '60. That brought the year's total to 263. Fifty of the 82 were chemical or petroleum plants.

AWO President Braxton Carr tells CHEMICAL WEEK that the increasing demand for waterfront sites has been apparent since '52, when his organization started keeping records. Since '52, a total of 3,461 plant sites have been developed. The fundamental reason, Carr propounds, "You can build rail spurs and highway cutoffs to the waterfront, but you can't build a waterfront."

Carr notes several areas that appear particularly attractive to chemical process companies—the reach of the Mississippi between Baton Rouge and New Orleans, and the Chicago area among them. Such built-up areas are, of course, expensive. Waterfront in heavily urbanized areas can cost \$10,000/acre or more, compared with a normal \$2,000-5,000/acre. On the other hand, observes Carr: "Some waterfront land in West Virginia can be obtained for practically nothing."

There are many variables (e.g., taxes, labor supply, etc.) that dictate waterfront land cost—not the least of which are company attitudes. Some companies like to locate where sewers, utilities, roads, etc., are already in place—and are prepared to pay a premium for the convenience. Others don't mind pioneering—as Olin Mathieson did in erecting its aluminum plant at Clarington, O. But carving a site out of raw countryside is costly.

Down by the Levee: Preparing waterfront sites is no simple job. In Mississippi, the Vicksburg project required dredging channels to give vessels having up to 12-ft. draft easy access to the Mississippi. Industrial fill raised the new site and its railroad and highway approaches above projected flood levels, about 27 ft. higher than the surrounding ground. Now, land is available for sale or lease in lots of two acres and up, most with water frontage and utilities.

Claims the Warren County Port Commission: "We are within 24 hours of over 40 million people in this vast area. Ample labor is available, and in amendments to the Mississippi constitution we have right-to-work laws. Utilities are reasonably priced. The Port of Vicksburg will be maintained as a free port. Certain advantages are to be had in ad valorem taxes."

Chicago, Too: A new industrial site

Waterfront	CPI	Projects	Planned	or	Under	Construction

Location	Company	Facility
Colcasion River at Lake Charles, La.	Continental Oil Petroleum Chemicals	Industrial alcohols plant \$733,700 plant expansion
Columbia River of Kalama, Wash.	Dow Chemical	Wharf
Comborland River near Mashville, Tean.	Du Pont	\$15 million plant expansion
Das Plaines River at Joliet, III.	Amoco Chemicals Olin Mathieson	Dimethyl terephthalate expansion \$1.5 million phosphoric acid plant
Galvesten Bay at Baytown, Tex.	United Carbon J. M. Huber Humble Oil Enjay Chemical	\$1 million plant expansion \$2.5 million plant expansion Rubber plant expansion Benzene and toluene plant expansion
Gulf Intraceastal Waterway at Texas City, Tex. Gulf Intraceastal Waterway at Brownsville, Tex. Gulf Intraceastal Waterway at Corpus Christi, Tex. Gulf Intraceastal Waterway at Freeport, Tex. Bulf Intraceastal Waterway at La Porte, Tex. Bulf Intraceastal Waterway at Port Arthur, Tex.	Plymouth Oil Monsanto Union Carbide Delhi-Taylor Oil Dow Chemical Du Pont Texaco	\$2 million benzene unit Chemical plant Chemical plant Chemical plant \$65,000 experimental salt water conversion plant Sulfuric acid plant Benzene plant
Houston Ship Channel at Houston, Tex.	Petro-Tex Chemical Dixie Chemical Columbian Carbon Air Reduction Sinclair-Koppers Chemical Pennsalt Clinton Chemical Phillips Chemical	Chemical plant Polyethylene plant Polyethylene plant expansion
Les Angeles Ship Channel at Les Angeles, Calif.	American Potash and Laporte Industries Tidewater Oil	Titanium dioxide plant \$20 million Iso-cracking plant
Lower Mississippi at St. Charles, La. Lower Mississippi at Chalmotto, La. Lower Mississippi at Baton Rouge, La. Lower Mississippi at East Baton Rouge, La. Lower Mississippi at Goismar, La.	Shell Chemical Kaiser Aluminum & Chemical U.S. Rubber Stauffer Ethyl Corp. Borden Co. and U.S. Rubber	\$1.9 million plant addition \$2 million plant addition Pilot plant Sulfur dioxide plant \$5.7 million plant expansion \$50 million chemical plant complex
Nechos River at Orange, Tex.	Firestone Du Pont The Big Three Welding Equipment Co.	Synthetic rubber plant Methanol expansion \$1 million chemical plant
Meckes River at Beaumont, Tex.	Houston Chemical	Tetraethyl and tetramethyl lead plant Ethylene plant
Obio River at Moundsville, W. Va. Tennessee River at Calvert City, Ky.	Allied Chemical General Aniline and Film	Chlorine-caustic expansion \$2 million plant expansion

near Chicago aims at attracting all types of industry. It encompasses over 9,000 acres located just west of the Dresden Nuclear Generating Station on the Illinois River 50 miles southwest of Chicago. Heralded as the "world's largest planned industrial park" it will be known as The Dresden Industrial District. The property covers nearly 11 miles of frontage along Illinois' deep waterway link between the Mississippi River and the St. Lawrence Seaway. Clifford A. Zoll, president of the recently formed Dresden Development Co., tells CHEMICAL WEEK that roads, rail spurs. and pipelines will be added as the need develops. Several chemical companies are reported to have expressed an interest.

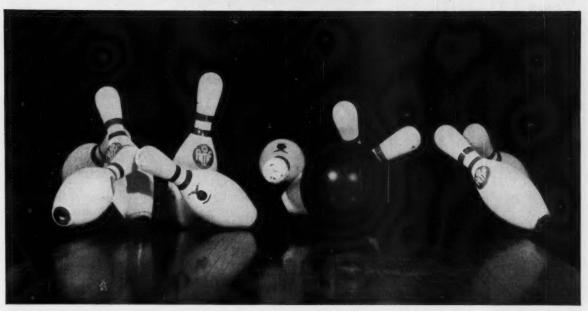
Presence of the Dresden Nuclear Power Station (a privately financed boiling-water reactor rated at 180,000 kw.) nearby has nothing to do with the site choice, according to Zoll. Neither do the site's backers expect that the presence of the reactor will deter industry or labor from locating in the area. The presence of water, proximity to Chicago, and lack of zoning restrictions are the primary reasons for the new development.

From the beginning, the backers envisioned the district as ultimately developing into a chemical complex. A low tax rate (ranging from \$1.60 to \$2.40/\$100 assessment, compared with around \$5 in Cook County) and an availability of some skilled "Grade 2" chemical workers in the area—a holdover from some of the coal laboratories once operating in the vicinity—also make the site more attractive for chemical operations.

Arkansas Travel: While natural waterways aren't "built" they can be made larger and more navigable, enhancing their value as plant sites. That's the object of the Arkansas River project, a \$1.2 billion federal program designed to open up the Arkansas River to commercial navigation and to exploitation for industrial expansion. Completion is now expected in '70, possibly as early as '67 in view of the new Administration's interest in public works.

The plan is to build 19 locks, 15 being low-lift and the other four medium-lift, to form lakes along the river. Most large towns on the Arkansas River already studying engineering plans for ports to utilize

HOW HERCULES HELPS...



MARK UP A STRIKE-A "pocket hit" is a thrill for the bowler but the pins take a beating. That's one reason why AMF Pin-spotters protects its new "Chemweld" pins with a top coat based on Hercules® nitrocellulose. In actual

usage these pins remain clean and require a minimum of maintenance. Rugged nitrocellulose-based protective coatings also find use in coating the alleys themselves-for a smooth, long-lasting surface.





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UN-32*, Hercules high-analysis nitrogen fertilizer solution, contains 32 per cent nitrogen by weight. Manufactured in California, UN-32 can be shipped to customers rapidly by tank truck, tank car or in larger quantities, via barge. A nonpressure, nonflammable material, UN-32 can be applied to soil by conventional spraying equipment, or fed into irrigating systems, or applied from the air. *Hercules trademark

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ADMINISTRATION

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								diglyme 73		
p-toluyl								diglyme 61		
m-chloro	b	er	12	0	yl			diglyme 63		
o-chlorol	be	n	Z	ру	1			diglyme 20		
pivaloyl								diglyme 44		
pivaloyl								THF 60		

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PIONEERS IN HYDRIDE CHEMISTRY



205 CONGRESS STREET BEVERLY, MASSACHUSETTS

the 9-ft.-deep, 520-mile-long channel. One of Oklahoma's hopes is that once the river becomes navigable, a large petrochemical complex will be developed in the northeastern part of the state. Already John Deere Chemical Co. makes ammonia and urea at Prvor, and Callery Chemical (boranes) and Fansteel Metallurgical are located in Muskogee. A lot of other chemical process companies are looking at the area. The recent trend toward using gas and LPG before they cross a state line will probably mean that the state of Oklahoma will see considerable increase in the rate of petrochemical and other CPI development in the future.

Other attractions to industry include coal, pure limestone, natural gas reserves, woodlands, and minerals in the area. When the system is completed, traffic is expected to reach 13 million tons/year, about balanced in up- and downstream movement.

Glenn Wynn, president of Sunray Chemical Co. (Tulsa), says, "This project is a must for materials that move up and down the Mississippi and along the Gulf Coast. We could use water transportation this year, from our Tulsa refinery and petrochemical plants to our Corpus Christi refinery and plant, and to Gulf Coast customers. We will probably install a pipeline system for the 12-15 miles between our refinery and petrochemical plants in Tulsa to Catoosa."

Sunray makes benzene, ethylbenzene and other petrochemicals at Tulsa. It makes styrene at Corpus Christi, using materials from Tulsa. John Deere Chemical feels the new waterway will allow it to be in a better competitive position in the export market via ports of Houston or New Orleans. Callery and Fansteel like the prospect of water freight rates.

In the Pryor area, local citizens have set up a public trust, are now negotiating with the General Services Administration in Washington on the possibility of buying 10,000 acres of choice industrial land sites from the over-30,000 acre abandoned Oklahoma Ordnance Depot. The land is on the Grand River, looks highly desirable with water transportation imminent.

Peabody Coal Co. is already investigating the possible location of a coking project built on the old ordnance site. It would produce coke

for sale to the Midwest Carbide Co. at Pryor. Ohio Rubber Co. is now locating a new industrial rubber plant at Fort Smith, Ark.

Western Opportunity: Site seekers are also keeping an eye on the ship channel now being widened to allow ocean-going vessels to travel from San Francisco Bay all the way to Sacramento. Completion is scheduled for '63. A company locating along the channel would have to put in its own turning basin (since the channel isn't very wide) or else have its vessels steam all the way to Sacramento (84 miles from San Francisco). (But this is not considered a serious problem.)

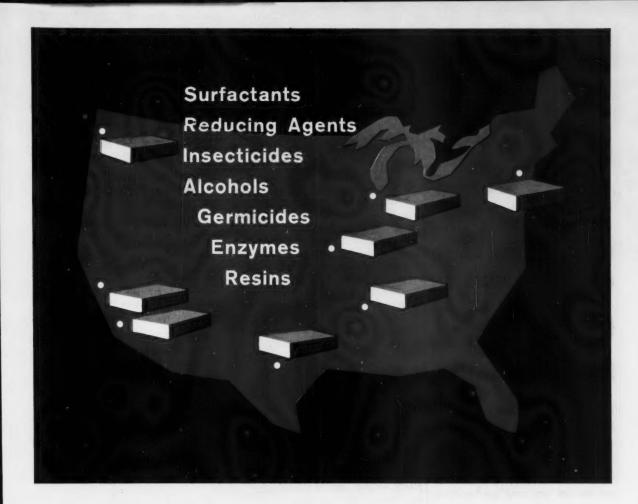
As added incentive to locate along the channel, a 36 in. natural gas line is coming into the area from Canada. The line will be completed in Dec. '61, bring relatively cheap Canadian natural gas to Antioch, the start of the ship channel, trigger further industrial activity in the already bustling region (CW, Oct. 1, '60, p. 39).

If CPI expansion continues at its familiar clip, waterfront plant sites are sure of continued demand. As one traffic manager puts the problem: "In some places the asking price isn't quoted by the acre but by the foot." For most locations, though, that's not the case. And new waterside developments will help supply keep pace with demand.

LABOR

Peace Plan: A plan to prevent strikes on industrial construction projects—including chemical plants—was unfolded in a recent joint statement by the Building and Construction Trades Dept. (AFL-CIO) and the National Constructors Assn. Officially labeled as The National Disputes Adjustment Plan, it is the result of nearly a year's negotiations by both groups.

The plan calls for improved prejob conferences so that possible trouble spots can be detected before construction is well along. It asks for closer working relationships between responsible representatives of NCA member companies and their counterparts in the international unions. And it requires "last resort" arbitration of a dispute by a national arbitration board, to be composed of three representatives from NCA (which is made up of 28 engineering and construction



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Solution: The exteriors of the tank trucks were coated with GACO H-2 Hypalon as a protection against the continual splashing and spillage of acid during loading and unloading.

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ADMINISTRATION

firms), three from the department, with a seventh member as a neutral chairman, if necessary. Any decisions of the national arbitration board would be binding upon the parties. Resort to the board, however, would occur only when both sides to the dispute agree to submit their arguments.

Firestone Settlement: An eight-dayold strike of production workers at the Firestone Synthetic Fiber Co. plant in Hopewell, Va., ended with the acceptance by the union of a twoyear contract covering wages and working conditions. Terms of the contract (the first negotiated between Firestone and Local No. 15061 UMW District 50) were ratified at a meeting of union members. Although exact terms of the new wage pact were not revealed, the total wage package amounted to an average 24¢/hour inrease.

Monsanto Settlement: Improved pensions, new vesting rights and improved hospitalization and insurance are provided in a company-wide agreement negotiated between Monsanto Chemical Co. and five unions representing some 9,500 employees at 15 plants. OCAW, one of the participating unions, said the plan provides \$186.75 monthly retirement income for most 25-year employees.

Olin Mathieson Contract: Union members ratified terms of a 15-month contract with Olin Mathieson Chemical Corp. at Pasadena, Tex. The contract calls for a 14¢/hour increase, is retroactive to Dec. 19, upgrades the pay classification of one-fourth of the mion members. It also stipulates an automatic extension of the contract intil the company or the union gives 60 days' notice that it wants to change the pact. Olin Mathieson workers have been getting \$3.07-\$3.14¢/hour.

Bargaining Ruling: The Supreme Court has in effect ruled that the Celanese Corp. of America must bargain with the Textile Workers of America (AFL-CIO). Celanese had protested a representation election in which the Textile Workers were named pargaining agents, claiming that the mion had used misleading information as part of its election campaign. The verdict supported an earlier NLRB ruling that was reversed.

KEY CHANGES

Tommy D. Greer to vice-president, Texize Chemicals, Inc. (Greenville, S.C.).

Fred H. Moore to executive vicepresident, Mobil Oil Co. (New York).

Frank N. Getman to executive vice-president, Richardson-Merrell Inc. (Cincinnati).

H. D. Kinsey to vice-president, Union Carbide Corp. (New York).

Henry C. Yutzy to vice-president, Eastman Kodak Co. (Rochester, N.Y.).

John M. Halsted to vice-president, purchasing, Colgate-Palmolive Co. (New York).

Harry W. McNey to executive vicepresident, McNeil Laboratories, Inc. (Philadelphia).

Milton R. Mathews to senior vicepresident; Maurice James O'Brien to vice-president, sales, Marblehead Lime Co. (Chicago).

Zolten Merszei to vice-president and general manager, European operations, Dow Chemical International Ltd., S.A. (Zurich, Switzerland).

George R. Armstrong to the board of directors, Virginia-Carolina Chemical Corp. (Richmond, Va.).

William M. Allen to the board of directors, Standard Oil Co. of California (San Francisco).

Rolf H. Stein to the board of directors, Victor Blagden & Co. Ltd. (London).

A. M. MacKinnon to treasurer, Warner-Lambert Pharmaceutical Co. (Morris Plains, N.J.).

Hamer Wilson to the board of directors, Rexall Drug and Chemical Co. (Los Angeles).

Warren J. Rowley to vice-president sales, Clark-Schwebel Fiber Glass Corp. (New York).

M. P. Weigel to the board of directors, Aluminium Ltd. (Montreal).

J. S. Bardin to vice-president, Callery Chemical Co. (Pittsburgh).

Leslie T. Fournier to the board of directors, National Distillers and Chemical Corp. (New York).

CHEMICAL

from

Allied hemical

- new curing agent for epoxy resins
- chlorine safety program
- two new uses for urea-formaldehyde concentrate
- phenol production expanded

easy-to-handle curing agent from Allied Chemical contributes valuable properties to epoxy castings

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An unusual application—in epoxy resins of high quality for embedding tissue for electron microscope slides, which must be sliced to almost incredible thinness without crumbling or disintegrating. Other interesting applications in rubber, rust-inhibiting compounds, greases, viscosity improvers, alkyd resins, inks, surfactants, and in many other fields, too. For more information, write for Bulletin I-8R.

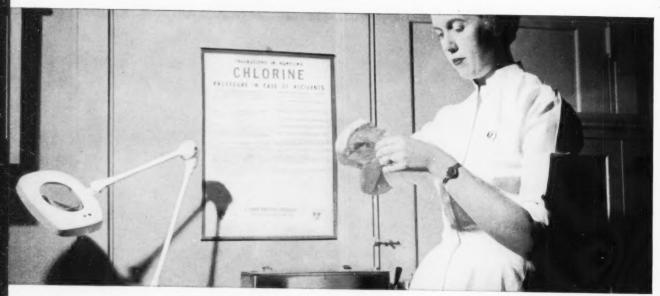
M NATIONAL ANILINE DIVISION

Photo courtesy of Cornell Aeronautical Laboratory, Inc.





how Solvay helps customers with complete chlorin



Safety posters list precautions to be taken in handling chlorine and procedure in case of accidents. Safety manuals, films and educational literature are also provided.



Solvay provides consultation on chlorine safety facilities and procedures. Here, technical service representative explains use and care of protective clothing.

safety program

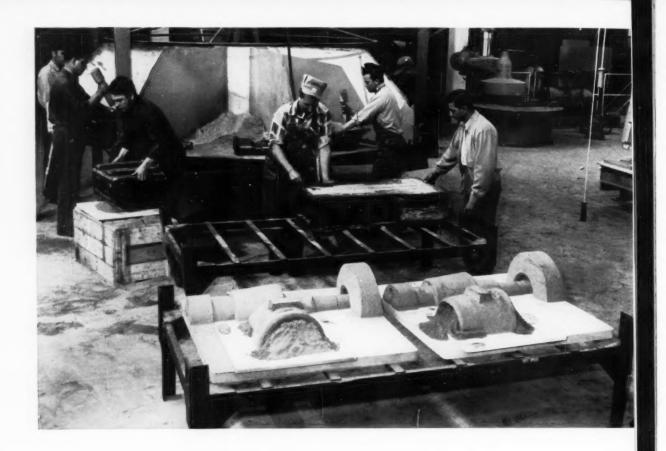


Employees clear "danger" area in emergency drill. Safety training of personnel is another important facet of Salvay's integrated safety program for customers.



Equipment from a Solvay Chlorine Emergency Kit being used to stop leakage in tank car dome. Similar kits are available for 150-lb. cylinders and one-ton containers.

Photos on this page show several phases of a typical program in operation at a customer's plant. If you are a user of chlorine, the same service is available to you. Ask for information. **SOLVAY PROCESS DIVISION**



ullet research points the way to new uses for U.F. concentrate-85

Allied Chemical research has added two new uses to the already impressive number of applications of U. F. Concentrate-85—a high solids content product of urea and formaldehyde.

In the wood products field, U. F. Concentrate-85 is now being used for "in situ" resin binding of plywood and particle board. Basically, veneer is spread, (particle board chips are sprayed), with an unreacted U. F. Concentrate-85—urea binder mixture. It is then placed in presses under proper temperature and pressure, and finished panels are produced.

U. F. Concentrate-85 also offers a low-cost route for preparation of green sand for core molds, and is presently used in large foundry operations. Mixed with urea and a small quantity of additive, cured cores have an excellent surface, good burnout properties and adequate tensile strength.

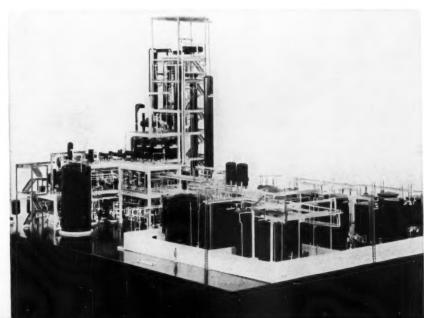


INTROGEN DIVISION

• Allied Chemical expands phenol production as basic chemical demonstrates potential in new applications

Recent developments indicate that the potentialities of phenol—now widely used in the manufacture of dyestuffs, medicinals, insecticides, phenolic resins, caprolactam monomer for fibers and molding compounds, and many other materials—are still far from being fully realized. Looking ahead to an ever-increasing demand for this basic chemical, Plastics Division has recently expanded its production facilities at Philadelphia, Pa. Only Plastics Division can supply every grade of phenol, both synthetic and natural—with fast delivery by tank car or trucks from Philadelphia or Toledo assured. Allied synthetic phenol is made to specifications more exacting than those required for the U. S. P. grade; and in liquid water solutions in strengths of 90-92 and 82-84 per cent. Plastics Division invites your inquiries.

PLASTICS DIVISION



Scale model of phenol expansion at Philadelphia, Pa.

 principal products for industry: BARRETT DIVISION—prepared roofing; built-up roofing; fibreboard, gypsum and other building products; paving materials, including bituminous liquids, bituminous concrete and aggregates.

> GENERAL CHEMICAL DIVISION-sulfuric and other commercial acids, alums, phosphates, fluorine and sodium compounds; BAKER & ADAMSON reagents and fine chemicals; GENETRON refrigerants and aerosol propellants; agricultural insecticides, fungicides, weed killers and specialties.

> INTERNATIONAL DIVISION-selling Allied Chemical products for export markets.

> NATIONAL ANILINE DIVISION-NATIONAL dyes and certified colors; HARMON COLORS (organic pigments); NACCONOL detergents, organic chemicals and intermediates, pharmaceutical chemicals; NACCONATE diisocyanates for urethane products; CAPROLAN nylon fiber.

> NITROGEN DIVISION-ARCADIAN fertilizers, nitrogen solutions; PROCADIAN feed mixtures, ammonia, urea, ethylene oxide, ethylene and polyethylene glycol, ethanolamines.

PLASTICS DIVISION - coal-tar chemicals; PLASKON molding compounds, industrial and coating resins; A-C polyethylene; industrial tar products, including creosote oils, pitches, coatings, pipeline enamels.

SEMET-SOLVAY DIVISION-Coke and by-products; WIL-PUTTE by-product coke ovens and coal chemicals plants and engineering services.

SOLVAY PROCESS DIVISION—soda ash, caustic soda, potassium carbonate, caustic potash, chlorine, chloromethanes and benzenes, hydrogen peroxide; calcium, aluminum, ammonium chlorides; cleaning compounds; vinyl chloride: MUTUAL chromates.

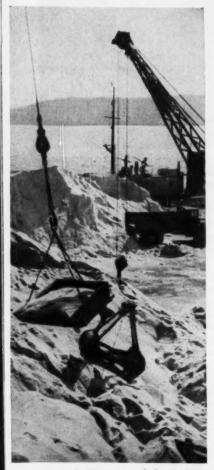


BASIC TO AMERICA'S PROGRESS

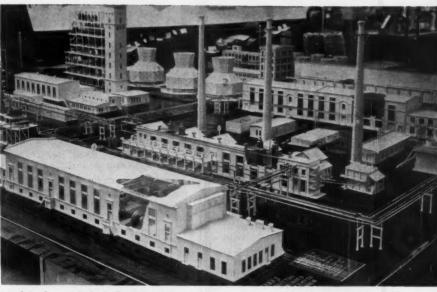
Allied Chemical Corporation, 61 Broadway, New York 6, N.Y.

In Country Allied Chemical Canada, Ltd., 1450 City Councillors Street, Montreal

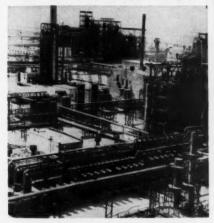
ENGINEERING



Harvesting fertilizer in shallow straits off the Caspian Sea. The hot sun evaporates water, concentrates salts.



Model of an ethyl alcohol plant demonstrates some of the Soviet's special CPI design-note European-style cooling towers in upper-middle of the picture.



Textile plant could be compared to the American-designed and -built plants Russia has purchased in expansion program.



Sulfuric acid unit is part of a chemical complex in Aktyubinsk. The plant makes use of enormous phosphorite deposits.

What It's Like Building Plants in U.S.S.R.

Sterling Moulding Materials, Ltd. (Cheshire, England) is shipping \$2.1 million worth of equipment for Russia's first polystyrene molding powder plant. This installation is one of the 50 chemical plants that the U.S.S.R. has had supplied or built by non-Russian sources during the past two years. And there's evidence of a strong future business as the Soviets increase their chemical activity by 10% each year.

This July, a group of Sterling Moulding's engineers will go to Russia to supervise installation and startup of the plant. (Its capacity will be 10,000 long tons/year of toughened polystyrene powder.)

U.S. policy prevents American firms from dealing with the Russians in "strategic materials"—the list includes many chemicals. But some deals are allowed. Example: two American firms have contracted for textile and synthetic fiber plants to be built in Russia.

Von Kohorn International (White Plains, N.Y.) is supplying and installing equipment for synthetic fiber plants at Kursk and Ryzan. Intertex International Corp. (New York), a representative of many leading textile firms, has a similar contract for textile equipment destined for Kalinin and Leningrad.

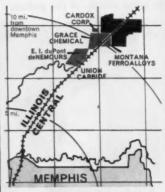
To provide insight into what it's like to build in Russia, correspondents from McGraw-Hill World News have just talked with executives and engineers experienced in building plants there.

One executive of a European chemical firm said, "A good rule of thumb for a Western firm to keep in mind when making its first approach to Russia is to consider the country

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of Illinois Central property located north of Memphis at Woodstock, midway between Chicago and New Orleans . . . a fast growing industrial community with such fine neighbors as E. I. du Pont Company, the Grace Chemical Company, Union Carbide, Montana Ferroalloys and Cardox Company.



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with our Director of Industrial Development is sure to save you time in selecting the best plant site to fit your needs. Contact J. S. Frost, 135 E. 11th Place, Chicago 5. Telephone WAbash 2-4811.

ILLINOIS CENTRAL

Main Line of Mid-America

ENGINEERING

an underdeveloped nation—one with lots of money."

A West German chemical executive adds, "By making an extra effort to be prepared for the unexpected, a Western firm can meet its bid price, specifications and the deadline without much difficulty."

The consensus seems to be that unusual situations may pop up on a Soviet job at any time. But by and large, putting up a chemical plant in Russia is surprisingly similar to building one almost anywhere else in the world. And often it's a much better business proposition.

Attraction: There are two chief reasons why export-minded chemical plant builders are particularly attracted to Soviet business: the Russians pay cash and they look for quality rather than low price.

Chemical firms outside the U.S. say that the U.S. is the only other place where they can make as good a financial arrangement as they can in Russia. But in the U.S. the competition for plants and processes is fierce.

In other industrially developed countries of the West, U.S. competition is just as tough and the financial terms aren't so attractive. As for the wide-open market of the underdeveloped Asian and African countries, such nations seldom are able to make cash payments—and often the contractor must help his customer get a loan in order to be paid.

The Russians' inclination to emphasize quality rather than price when evaluating a bid is explained in this statement from a top German engineer: "They want to get the best process and plant design in every situation. It's their craze to catch up with the West. That's why they don't worry about costly equipment—when they're convinced it might push up their output a few percent."

So engineers—West Europeans, sometimes Japanese and Americans—can throw the full weight of their technical know-how behind a plant bid. In most cases, sharp, smart design will beat out a cheap, inferior proposal. This is a very satisfying, all-too-rare situation for the engineer. This and the favorable payment setup explain the appeal of Russian jobs.

Bidding: As is the case with industrially underdeveloped nations, bidders are competing only against other foreign firms. No Soviet groups are

involved in the competition. Reason: when the Kremlin opens a chemical job for bids, it is usually seeking technology in an area where it regards itself deficient. It behaves as if it had no chemical industry at all.

So, in most cases, this means that the Russians are looking for the complete installation, rather than a process license.

From their foreign bidders, the Soviets want a process, detailed engineering of the plant itself, process equipment including piping and sometimes even structural steel, auxiliary facilities and a full force of construction supervisors and plant startup personnel.

This sort of complete package deal is uncommon in industrialized countries. But the Russians aren't well equipped to take on a job from process data or even a plant design.

One exception: if plant buildings can be built with concrete, the U.S.S.R. usually handles this end of a deal. Apparently, they've become masters of prefabricated concrete structures and take great pride in this. Another exception: they can be expected to provide their own power plant.

One point on bidding that Europeans are quick to praise is that the Russians prepare exceptionally complete specifications for their mammoth jobs. A central chemical industry bureau in Moscow—where all bid specs are drawn up—is staffed with highly competent engineers, educated in West European and American engineering standards and practice. Moreover, they are well-trained to discuss bids with their Western counterparts and to sensibly evaluate bid proposals.

Nevertheless, many chemical firms experienced with Russian work offer a word of caution on what is otherwise a reasonably normal sealed-bid procedure. The Soviets like to push for very strict delivery terms for every stage of a project, often playing one bidder against another on this basis. "Usually, these delivery terms are totally unrealistic," says one chemical man, "And the firm that falls into the schedule trap can be in a lot of trouble."

Trap: The catch is that transportation facilities in the Soviet Union, such as arterial highways, and railroads, are still well under Western stand-

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ards. Besides this, weather conditions vary more widely and are more severe. So when a chemical plant is slated for a slightly out-of-the-way location (frequently the case) transporting heavy process equipment can be extraordinarily difficult.

This problem arises partly because Russians accept bad transport as a fact of life. They're not disturbed when they can't bring needed tools and supplies to the construction site until well past the deadlines they themselves insisted on. Result: Western firms find themselves breaking backs to keep up to schedule only to find equipment rusting in the snow until after the March muds because the Russians couldn't ship, say, a new welding torch or special wrenches.

Construction: Further complications may arise because Soviet tools are often of poor quality, outdated in design and in short supply. Comments one engineer, "We were astonished at the old-fashioned methods these people use and their low level of training. Much of our process equipment was too complicated for them. For example, in one case we couldn't find a pipefitter who could fit a particularly large globe valve to the underside of a reaction vessel. As usual, one of our own engineers had to do the job."

At a polyester plant built by an American firm, engineers tried for days to trace a shipment of delicate electronic components which had not been delivered. Says the firm's New York man, "We finally found them half-submerged in a mud puddle, packaged in a box that was plainly marked in Russian: 'To Be Stored in a Dry Place.'"

Personnel: The reason for these construction problems — often similar to those in underdeveloped nations—can be traced back to the Soviet Union's much-vaunted education system. It apparently produces only two types of engineers, very good ones or very bad ones, observes one German company. The very good men get top jobs such as drawing up bid specifications, heading R & D projects and working on high-priority rocket and atomic energy programs.

There is no middle layer of competent engineers who can handle complicated challenges such as starting up and operating synthetic fiber plants. So the very bad engineers get these jobs and they are not as competent as

even run-of-the-mill Western counterparts.

The Russians themselves are well-aware of this situation. They give their field engineers very little authority or responsibility on a project. However, this serves only as an annoyance to Western engineers, who must always check with the Moscow headquarters for approval on decisions that in the West a field engineer would be empowered to make.

In addition to these problems, engineers consider assignment to a Soviet job "a hardship post" comparable to a jungle job in South America or a desert job in North Africa. Except for occasional trips to Moscow, Western food is rarely available. One company tells of building a chemical plant in a small Siberian town where its sixengineer team had to be put up in one room—and share a single bathroom and toilet with 30 other guests in the local hotel.

Besides the physical inconveniences, there are psychological circumstances which irritate Western personnel. As in the case of all foreigners in the Soviet Union, the Russians keep very close check on their movements, restrict traveling and sightseeing. Supervisory and advisory tasks can be very frustrating, since most Russians, after years of exposure to government propaganda, are suspicious of Westerners.

Engineering: Aside from information on plant construction in Russia, the McGraw-Hill World News survey turned up some word on the state of chemical engineering in the U.S.S.R.

A summary of findings is that, although the Russian chemical industry is growing at a rate about twice as fast as U.S. industry's, it faces major problems: (1) obsolete technology in several areas; (2) an inability to get new chemical processes developed and into actual production as fast as desired; and (3) a lack of sufficient automation and mechanization.

An outstanding example of obsolete technology is that butadiene for synthetic rubber is still made from ethyl alcohol. Most of this raw material comes from expensive agricultural products, while refinery gases containing butane and butenes are wasted.

Process development also is lagging. In '58 when the U.S. plastics delegation returned from Russia it reported that the Soviets had plunged into a polyethylene R & D program to come

up with a productive process. They had failed.

Soviet lack of mechanization was pointed out when a Russian delegate visited the International Paper Co.'s Three Rivers, Quebec, plant. He explained that at one of Russia's new installations the output per worker per year was 208 tons of paper and cellulose. The same figure for the Canadian plant is 253.

And this is an example of exceptionally good performance. Comparisons show that the Soviet chemical worker's productivity is about half that of his U.S. counterpart.

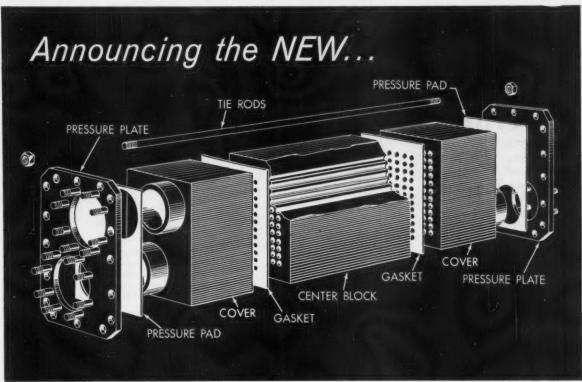
A broad look at Russian chemical engineering, however, shows that the only real deficiency is in know-how—something that will be overcome with experience. And Soviet engineers have a strong catalyst for their growth: they have a thorough grounding in the sciences, closely integrate basic and applied research.

Politics: Contrary to what the uninitiated might expect, politics is not one of the problems that a Western executive must face in dealing with the Kremlin. The experienced chemical firms have found that the vagaries of Communist "cold warring" are pretty much out of the picture when Russians get down to serious talk about a multimillion - dollar plant. Says one European, "All they want to know is whether you have the material they want and if you can deliver it."

The one political consideration that a Western firm must cope with: it usually must get permission of its own government before making a Russian deal. And, although this means more paper work than a chemical executive ordinarily handles, experienced men have the routine down pat.

All in all, Western firms see the Soviet Union as a source of sizable and very profitable business. One German firm built a \$12-million synthetic fibers complex there last year, is now bidding for its second Russian job. Another chemical engineering firm has three large Soviet plants under its belt, admits that it's seeking enough work to keep it busy in Russia for the next 10 years.

The Russians can make some vigorous demands. But the firms that can satisfy them—produce top-quality product and deliver it right on time—stand to reap healthy profits, long-term business.

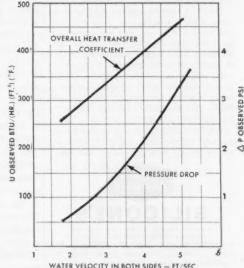


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ENGINEERING

PROCESSES

Urea: Chemical Construction Corp. (New York) reports that its new urea process (CW, Nov. 12, '60, p. 69) has chalked up two months of successful operations. Installed in the Cooperative Farm Chemicals Assn. plant at Lawrence, Kans., the process boasts of lower initial investment, savings in utility and maintenance costs. It uses a carbamate solution recycle technique, which is said to permit high utilization of the raw materials—ammonia and carbon dioxide. Also, it reportedly has a unique heat conservation system.

Regenerating Air: A new system for the continuous regeneration of the atmosphere inside nuclear and other submarines is now under development. Working under a just-awarded U.S. Navy contract Ionics Inc. (Cambridge, Mass.) expects to integrate an electrochemical oxygen-generating cell and a waste carbon dioxide absorbtion unit into one package. The trick is to meet the tight space requirements of submarines; Ionics hopes to go one-third to one-half better than this requirement by making components do double duty.

Oxygen-Smelting Copper: A new process for using oxygen-enriched air in converters used for smelting copper concentrates is being claimed by the Nippon Mining Co., Ltd. (Saganoseki, Japan). American firms are now trying to justify this use of oxygen (CW, Oct. 8, p. 72). Pelletized copper concentrates are charged to the converter and smelted in a bath of matte. This matte-about 30-45% copper sulfide mixed with iron sulfide is then blown with the oxygenenriched air. And copper is recovered from the converter slag as a sulfide concentrate. Savings are claimed to be in the high rate of copper recovery. This was reported at a meeting of the Metallurgical Society of AIME.

Foreign Technology: Technical papers written by chemical engineers in Russia, Eastern and Central Europe and China, now inaccessible because of the language barrier, will be transland in a quarterly journal. Edited by Waldo Hoffman, it will be published by the American Institute of Chemical Engineers.

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Technology

Newsletter

CHEMICAL WEEK March 11, 1961 Two new rocket casing successes for CPI materials add fuel to the metal vs. plastic hassle. The U.S. Army Ordnance Missile Command (Huntsville, Ala.) successfully static-fired an improved high-energy solid-propellant rocket motor with a high-strength titanium motor case said to be almost 30% lighter than conventional steel cases.

Simultaneously, Hercules Powder Co. announced that the Navy's new A-2 Polaris, which has an increased range of 300 miles over the A-1 version, "might well set a trend in the construction of rocket cases for military vehicles." The Polaris case is made of Hercules' Spiralloy, filament-wound glass fiber with resin binder.

For first-stage motor cases, where weight is not critical, steel seems assured a spot. But in the upper stages, it is a battle of cost, weight and other physical considerations. The fabricated cost of titanium is about 20% higher than steel. But titanium cases weigh a little more than half as much (353 vs. 639 lbs. for the second stage of Minuteman) as vacuum-melted steel (vacuum melting is needed for high purity).

Spiralloy, which is lighter and less expensive than titanium, is used in the upper (third) stage of Minuteman and is being used for the upper (second) stage of Polaris. It has higher strength than titanium (its burst strength density is 1.6 million or higher, compared with 1.1 million for beta-titanium—titanium's high-strength alloy). But in intermediate stages, stiffness is a critical factor because the motor case must resist buckling—and here titanium seems to hold an edge.

Also, some motor case designers talk of the "liquescence" of plastic and glass—i.e., the pickup of moisture in storage, which tends to warp and distort the case. Hercules says that with its design experience (four or five years) it can overcome these factors if they are critical. But liquescence can't be discounted in the ultimate material choices that must be made.

First large-scale use of fuel oil in a blast furnace in North America is taking place this week, as Dominion Foundries Steel, Ltd., switches one of three blast furnaces at its Hamilton, Ont., plant to full-scale use of oil in the air blast.

The technique, which uses either fuel oil or gas to raise the maximum temperature at which the air blast can be shot into the furnace, saves on coke consumption via heat economy. It takes 4 tons of air to produce each ton of iron; this air can be heated at negligible expense by burning waste carbon monoxide-rich gases leaving the top of the blast furnace. But its maximum temperature is limited by the oxidation or reducing atmosphere existing just above the tuyeres, where the air blast enters at the bottom of the furnace.

The process is used commercially in Western Europe. Among

Technology

Newsletter

(Continued)

other firms looking at the process in North America are U.S. Steel, Esso Research and Engineering Co., Dominion Steel & Coal Corp. Ltd.

Data on products and processes developed behind the Iron Curtain will be offered by a joint team consisting of Robert S. First, Inc. (New York), and Petrole-Chimie (Paris). In May the two firms will launch a multiple-client survey by going behind the Iron Curtain to interview a flock of chemical process companies. Information to be supplied to clients will include: a brief description of product or process, status of patents or knowhow, stage of development, availability for licensing, potential markets, and firms or persons behind the Iron Curtain to whom to write for further information.

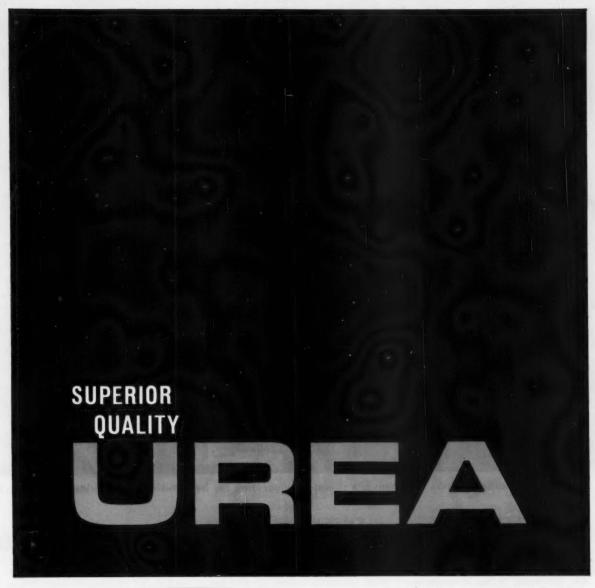
The team reports that preliminary investigations have uncovered processes for trisodium phosphate, acetylene via partial oxidation of methane, resin waxes, graft polymerizations, and vinyl chloride.

A new organic semiconductor based on an ion-exchange resin has been developed by Armour Research Foundation (Chicago). ARF starts with a sulfonated polystyrene resin, puts nickel atoms on the exchange positions. The product is said to exhibit good semiconductor properties. Versatility is one of the main appeals of the approach, since other resins and metals can be used to obtain varying polarities. The system is three-dimensional, whereas others are two-dimensional (CW, Nov. 5, '60, p. 103).

Two new miniature electronic devices based on different concepts have been developed. A radio receiver based on "molecular electronic" functional building blocks has been designed by Westinghouse for the Air Force's Wright Air Development Division. Each block performs a complete electronic function (e.g., amplification, detection) without requiring separate components (CW Technology Newsletter, Jan. 30, '60).

The other device is a miniature tantalum capacitor, which will be marketed in April by Radio Corp. of America. RCA, which has been working on "microminiaturization" of individual components, notes that capacitors had not kept pace with the steadily diminishing size of other components. With the new capacitor, size reduction (one-half to one-sixteenth the weight of comparable units), electronic manufacturers will be able to make substantial reductions in circuit sizes.

A radar system based on an optical maser has been developed by Hughes Aircraft Co. Using a ruby maser to transmit a beam of coherent light (monochromatic and narrow), the device can be used to estimate distance by measuring the time required for the light to be reflected by an object and return. It's called Colidar (for coherent light detection and ranging). A range of about 6 miles is expected in clear weather, while the useful range in space applications will be much larger.



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Chemical specialties makers find Denver's climate invigorating for both business and living. City is in key

Mile-High Specialties Market

In the center of the Rocky Mountain marketing region is mountaincradled Denver, Colo. (above)—hub of a growing circle of specialties producers.

Sherwood Solvents Inc. (Kansas City, Mo.), which just opened a new distribution unit in Denver for chemicals, solvents, polyester resins, catalysts and plastics typifies the sort of specialties maker that is shifting to Denver. And its reasons for moving there are typical, too: "We came to the conclusion," says plant manager Harold Anderson, "that the industrial development here warrants our installation and we are confident that Denver's amazing growth will continue."

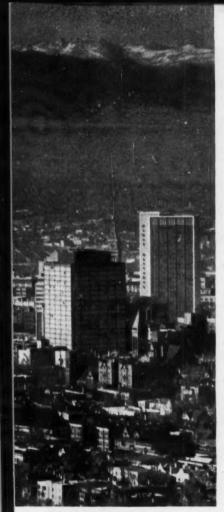
Other factors figuring in the lure of Denver are its good transportation facilities, dry climate, adequate supply of technically trained workers and pleasing living conditions. For some specialties makers, Denver has the added attraction of itself being a fast growing market for their wares.

Postwar Baby: The largest city in the Rocky Mountain states, Denver and its surrounding metropolitan area (roughly triangular in shape, with Denver, Boulder and Greeley at points) encompass about 3,700 sq. miles. It takes in five counties—Denver, Arapahoe, Adams, Jefferson, Boulder.

At the start of '61, census figures showed 923,161 residents in the metropolitan area, a jump of over 50% since '50. Colorado's population as a whole increased 32% between '50 and '60, to 1.8 million and was one of the fastest-growing states in the country. By '70, it's estimated that the Denver area population will be hitting 1.5 million, 62.5% higher.

In the County of Denver, figures for Jan. '61 vs. Jan. '60 show: building permits up 643 (value up \$1.7 million); and sales tax collections up \$14 million. In the Denver metropolitan area, electricity consumption was up 20 million kwh.; gas consumption was up 1.1 million cu.ft.; and total department store sales were up 7.7%. Unemployment in the area was only about 4% in Jan. '61, much lower than the national average, and total employment was up 18,000 (to 388,-328).

Although Denver has been primarily a distribution center by virtue of its location, since World War II it has witnessed an unusually rapid expansion in small manufacturing, especially electronics and other small components. The latest business census figures ('58) show that CPI population was 68 companies, with a sub-



distribution position.

Matures

stantial number of these involved in manufacturing specialties.

Transportation Gateway: One of the most important factors in Denver's chemical growth has been its location. It is a key truck terminal center with 17 major interstate trucking companies operating in and out of the city and the home base for the big coast-to-coast truck carrier, Denver-Chicago Trucking Co. Inc.

Six railroads give fast service to Salt Lake City, Omaha, Albuquerque, Chicago, Dallas, and St. Louis.

Big in Insecticides: Insecticide producers consider Denver a good base for their operations. Manco Chemical Co., 11-year old formulator of insecticides, weed killers, and fungicides, sold over 250,000 units of its products last year and had sales of \$300,000. Owner Harold Mankoff believes that a reason for the company's

success is that "We're in the fastestgrowing part of the nation where the climate permits beautiful gardens and maximum outdoor living."

Another factor listed by Mankoff: a small company like Manco is closer to its market than its big competitors. "By the time a big company hears about an outbreak of, say, grasshoppers—and reacts—the infestation is over. We're able to capitalize right-away."

Manco products are sold in 14 Western states, are also a big seller in Denver.

Time Chemical Co., which makes small package insecticides, herbicides, and bulk agricultural chemicals, stresses the excellent transportation aspects.

"Outside of Chicago, we have the best transportation in the country," says Philip Mozer, president and general manager of Time. "Our business is so competitive that the only advantage is better service and quicker distribution. Being in Denver gives us that necessary edge in the markets we service—the Rocky Mountain states and Canada."

Wax, Cosmetics, and Paints: Majestic Wax Co., 35-year-old manufacturer of products for cleaning and treating floors, has increased its sales 10 times since '49 and now markets on a nationwide basis in the U.S. and also sells in Canada. Its products are primarily aimed at industrial plants, hospitals and schools. Main factor behind its decision to locate in Denver: good climate and good living conditions.

Denver is represented in the cosmetics field by the Dry-O-Scent Co., a wholly owned subsidiary of Lehn & Fink Products Corp. (New York). Last fall, Dry-O-Scent acquired Noreen, Inc., long-time Denver manufacturer of hair rinse and dry-skincream products. It now distributes Noreen hair rinses nationally in the U.S. and to Canada and abroad. The company finds that over 90% of its market for its dry skin cream is in the Rocky Mountain states.

Printing ink makers operating in the Denver area include Flint Ink, Sinclair and Valentine, and Interchemical Printing Ink. In '40 there were about 39 offset-printing houses in the region; today there are about 180.

Great Western Sugar Co. operates

a monosodium glutamate plant and beet sugar molasses refinery at Johnstown, Colo.

Paint and varnish manufacturers find the area a good market because of a high rate of home building in the Rocky Mountain region and in the Denver area in particular. Among the local manufacturers are McMurtry Manufacturing Co., Benjamin Moore and Co., and Kwal Paints, Inc.

Kudos for Climate: Three specialties companies cite Denver's climate as a factor in their business. "We like the dry atmosphere," explains E. F. Van Dersarl, president of Rocky Mountain Research, Inc., a producer of fine chemicals and water-reactive marine flares. "We can handle anhydrous materials without going to the dry box. This means speedy handling from one container to another without elaborate precautions against moisture."

Mesa Chemical Co., a new firm, is starting to manufacture custom-made fiberglass containers. The company claims that products fabricated in Denver's dry climate are stronger than those made in more humid areas. John Means, president of the company and a former Shell employee, said he located in Denver because of the good living conditions and many fine recreational facilities (ski slopes are about an hour's drive from the city).

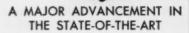
Still another company was drawn to the Denver area because its founders, ex-University of Colorado students, had enjoyed the invigorating mountain climate. Arapahoe Chemicals, Inc., started in '46, produces synthetic organic chemicals, with over 50% of its business in custom manufacturing. It manufactures specialty organic compounds on a moderate volume basis for use as reagents and intermediates by chemical and pharmaceutical companies. Sales in '60 were slightly over \$1.5 million, compared to '57 sales of about \$500,000. Besides the advantages of climate, Arapahoe likes the purity of local water.

A number of companies have sprung up in the area to supply chemicals (leaching compounds and flocculants) to the area's ore producers—e.g., S.W. Shattuck (molybdenum and uranium), American Smelting and Refining (cadmium), and General Chemical (fluorspar).

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in U. S. A. Vibro-Meter Corporation, Fribourg, Switzerland in Free Europe potential to specialty makers is road construction. A record road-building program, now under way, is a growing market for explosives, asphalt binders, etc. The nation's sixth-biggest rubber producer, Gates Rubber, is also in Denver.

With a growing population, a setting that is attractive to potential technical help and a growing industrial community of potential customers, Denver appears to have a good future for both sales and manufacturing of chemical specialties.

Fugitive Market

A new line of fugitive tints designed for use on synthetic and natural fibers is now being offered to the textile field by a newly established company, Chemtel Corp. (450 Seventh Ave., New York).

The product, known as Tint-Out, was developed by Speedry Chemical Products (Richmond Hill, N.Y.) and will be marketed worldwide exclusively by Chemtel. Chemtel's bid is the second recent one for this specialized industrial market — Polymer Industries, Inc. (Springdale, Conn.) has already launched its Rinsefree Tints for the same applications.

The need for fugitive dyes is growing because of the widening range of synthetics and blends used by the textile industry. The fugitive dyes (sometimes called "sighting" colors) are used to identify the various lots of fibers during carding, spinning, roving, weaving and other processing operations. Dilute solutions of conventional dyes have served as fugitive dyes, but these don't work too well on fibers made from such materials as polyacrylonitrile, and polyamides. Steaming to reduce kinkiness in high-twist yarns would often set dyes to the fibers or require considerable scouring to remove.

Finding a dye that's easily removed from all components of a blend of fibers frequently involves so much work that many times the mills run the fiber through without tinting. This, however, means special handling with concomitantly higher labor costs. But because the fugitive dyes are used in small volume, dyehouses haven't had much incentive to develop more than a few fugitive colors for the broad fiber range.

Chemtel may have a product to re-

solve these difficulties. Moreover, others too have been working in this field—e.g., last November a patent (U.S. 2,959,461) was granted to Edward Murray (Anderson, S.C.) for a process which also claims to produce fugitive dyes for natural and synthetic fibers. His system is a combination of: (1) poly-N-vinyl lactams, such as poly-N-vinyl butyrolactam (polyvinylpyrrolidone) and poly-N-caprolactam; and (2) colored water-soluble metal chelates.

Several products based on the Murray patents are on the market now, are being sold as water dilutable solutions to the textile industry by Polymer Industries (the Rinsefree Tints). The company, which is sole licensee of the products covered by the Murray patent, makes them at its Polymer Southern Division (Greenville, S.C.).

Composition of Chemtel's Tint-Out has not been revealed. But Chemtel is talking about the product's claimed advantages: it "makes possible for the first time the direct application to yarn of tints that are completely soluble in water." Other claims: it's 100% effective on Dacron and cotton and completely removable in normal scouring operation or in hot or cold water.

Growing product development makes it plain that a marketing battle is shaping up for the fugitive dye dollar.

Traffic Marker

American-Marietta Co. (Chicago) has entered a new field with its development of a Lite-Lane traffic guide system, including contoured markers, an epoxy-type adhesive and equipment to apply the markers to highways.

The plastic markers are 4 in. in diameter and contain glass beads which reflect when exposed to a car's headlights. The contour of the markers assures rapid water drainage.

The markers are applied by a cart with a gasoline burner which preheats both the markers and the pavement. Preset quantities of adhesive are released through a type of caulking gun.

The product can be set in place in a temperature range of 40 to 90 F and during light rain. The road can be opened to traffic in 2-10 minutes.

American-Marietta is now making its initial installations with its own crews but expects to license contracttors eventually.

CHEMAGINATION







DREAM BIG The plastic shape of things to come grows larger. One company, working with Hetron® -a Durez Plastics Division polyester resin-molds ends of subway cars in single units. Tough, fire retardant, corrosion resistant, these ends are part of a design that is expected to save \$6 million in costs over the fleet's life. FOIL FIRE WITH A PAINTBRUSH How? By painting walls, ceilings, stairs, woodwork with paint that fights a delaying action against fire. The safety ingredient in these paints is Het® acid—one of several Hooker fire-retardant materials. Among them may be just the one that could help you build more safety into a product of yours. CREATE A CLEANER WORLD from the bones that lie within it. Phosphate rock, the three-hundred-million-year-old skeletons of tiny animals, is the beginning. Dried, heated to fiery temperatures, reacted, it finally becomes compounds that stop minerals in hard water from retarding cleaning action. They're used in many detergents. to apply chemagination in your industry, write us.

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SPECIALTIES

Guide List

The American Hotel Assn.'s latest certified product list, a 32-page compilation, is now being mailed to the AHA's membership, and to members of 11 other national trade associations. The book lists cleaning and maintenance products and textiles that have been lab tested and certified to comply with the prescribed standards set up by AHA (221 W. 57th St., New York). This year's list included 416 items representing 18 types of cleaning and maintenance products and 26 kinds of textiles. The 11 associations besides the AHA which use the list include the American Hospital Assn., American Library Assn., American Motor Hotel Assn., Assn. of College Unions, Catholic Hospital Assn. of the U.S. and Canada, National Assn. of State Purchasing Officials, Hospital Bureau, Inc., National Assn. of Hospital Purchasing Agents, National Executive Housekeepers Assn., National Institute of Governmental Purchasing, and National Assn. of Building Owners and Man-

The existence of certified products ists is a touchy area with chemical pecialties makers; many of them feel hat the lists are used more as a crutch to a purchasing agent (he can blame the list if he gets a poor product) than as a guide to effective products.

Coatings for Cars

A new resin for automobile body namels has been developed by Monanto Chemical Co.'s Plastics Division (Springfield, Mass.). Big advantage, says Monsanto, is that the resing roduces paints that cure quickly at emperatures as low as 180 F without equiring a catalyst.

Resimene, 872 an etherified melanine formaldehyde resin solution of 0% solids content in isobutanol, is for use with alkyd resins to make namels for finishing appliances and ther metal products as well as autos. Enamels formulated with the product nay be baked at schedules varying from 30 minutes at 180 F to 10 minutes at 300 F with minimum gloss lifferential and high-color retention, ven when overbaked.

The wide choice of time and temperature conditions, according to Monsanto, permits reduction of bak-



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Dimethyl Itaconate is of particular interest as a comonomer for improving heat dis-

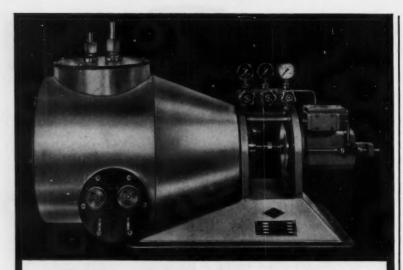
tortion temperatures, toughness and weathering in molding compounds. Both Dimethyl and Dibutyl Itaconate are effective comonomers for improving the weathering characteristics of protective coatings.

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SPECIALTIES

ing costs either by increasing the throughput or decreasing the heat requirement per unit. Further advantages are said to be elimination of mismatched color and gloss when components are baked at different schedules, and elimination of special patching formulations and equipment.

EXPANSION

IFF Buys: International Flavors and Fragrances, Inc. (New York), has acquired Kerr Fruit Concentrates Inc. (Portland, Ore.), producer of concentrated fruit and berry juices for the food industries. Kerr will continue as a wholly owned subsidiary and will supplement IFF's East Coast flavor production facilities.

New Pigments Plant: Wright Industries, Inc. (Brooklyn, N.Y.), has just opened a new plant to make magnetic ink pigments. The company has developed a process for producing pigments specifically for automatic data processors.

Midwest Move: Schenectady Varnish Company, Inc. (Schenectady, N.Y.), has appointed the Edward J. Lewis Co., Inc. (Chicago), as distributor for its complete line of resins used in the production of waxes and emulsion polishes. Lewis will be responsible for sales within a 200-mile radius of Chicago.

PRODUCTS

Fire Fighter: Celanese Chemical Co. (New York) has developed a water-glycol fluid that provides fire protection for industrial and military hydraulic systems. Celluguard has good low-temperature properties, is particularly suited for low-pressure hydraulic systems, protects against corrosion.

'Hangover' Cure: Tri-Kem Corp. (1834 Connecticut Ave., Washington, D.C) plans to market a "hangover" preparation tradenamed Quick-O-Ver. Ingredients include aspirin, phenacetin, caffeine, ephedrine sulfate, thiamine, nicotinamide, calcium carbonate and oil of peppermint. The product is recommended for "the distressing symptom of nausea, headache and depression due to an overindulgence in alcoholic beverages on a social level."



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Tips for the Foreign Tour

Recently returned from a stint as head of Stanford Research Institute's Zurich, Switzerland, office, Donald Benedict (right) has some first-hand advice to offer the growing number of U.S. firms that are considering temporary international exchange of research personnel.

He's enthusiastic about such exchanges, but—and a number of companies can bear out his thesis—there are certain pitfalls that can cut the gains to the individual, and which could cause the company to lose its sizeable investment in travel expense and work disruption at home.

The specific advantages and problems are somewhat affected by the form of exchange practiced. Most popular plan for the CPI: sending men on a year's visit to foreign laboratories -which may or may not be connected with the man's firm-and bringing a foreign researcher to an American lab. Also, U.S. firms are interested in the sending, by universities, of academic researchers. (The National Science Foundation, which has long provided grants for this purpose, has recently broadened its interests in this area by opening a Tokyo office to facilitate information and personnel interchange.) But the basic rules apply in all these cases.

Broader Viewpoint: Almost all companies that have exchanged researchers agree that the biggest bonus a company can gain is the broader viewpoint he will have when he returns. Says Benedict, "Any good man should return with broken prejudices, greater flexibility, expanded experience, greater awareness of current foreign literature and, above all, new enthusiasm and ideas that he is eager to put into his work."

A clear break with the daily routine is needed to give a man an objective look at what he's been doing and at what he might do. Although this change of scenery can be made without leaving the country, there are definite reasons for moving to a totally foreign atmosphere. Not only are the surroundings different, but also the very approach to scientific problems is different, causing the American researcher to ask "why" to many of the

things he had taken for granted here.

For this reason, Benedict points out, "U.S. scientists in Europe should make every effort to be in the European environment rather than merely on European soil." The "American colony," socially and scientifically, is one of the biggest pitfalls open to a visiting scientist. Unless he mingles with Europeans, and preferably uses their language, he will lose the advantages of being abroad and might as well have stayed home.

Thus a firm would evidently do best to let its men work in laboratories that are not related to the company, unless its purpose is mainly to facilitate internal communications and to supply temporary, specialized knowhow to a lab that needs it.

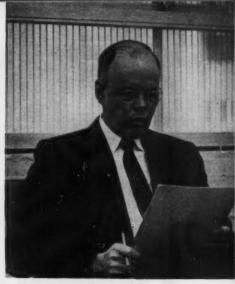
Make-or-Break Attitude: The frame of mind with which the man approaches his new assignment can often significantly affect the benefits he'll get out of it. For instance, it is a mistake to look at a foreign stint as one prolonged "fishing expedition." Among the most valuable assets to be gained from time spent abroad are new contacts and new knowledge. Neither are likely to be gained by the poised-pencil, what-have-you-to-tell-me approach.

To really gain from his stay, the visiting researcher has to be willing to give just as much as he wants to receive. As Benedict puts it, "Europeans are most perceptive in sorting out worthwhile from nonworthwhile visitors, and the latter will get the '25¢ tour.'"

One point this brings up: since U.S. companies seem to be the more active in seeking outside technology, they have been prime movers in personnel swaps. And since foreign researchers here seldom have nationalistic groups with which to associate, they readily blend in with purely U.S. groups.

Even with the proper attitude, however, the visiting researcher is not likely to come home with major secrets. His primary gains are more apt to be on the intangible side.

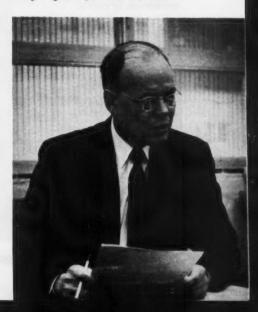
Question of Time: A critical factor in getting the most out of an overseas assignment is judging the right amount of time to spend abroad. If it's not long



SRI's Benedict: Foreign environment gives objectivity and new enthusiasm. . .



But researchers who want to get without giving will get the '25¢ tour.'



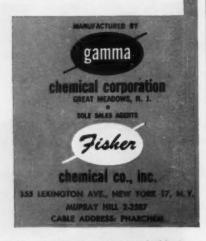


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enough, the man won't get enough out of it to justify the investment; and an overly extended stay can be harmful to the man's work and standing at home. Benedict offers as a rule-ofthumb that "the time required to catch up upon return can easily be as long as the absence."

The optimum length of the stay depends on the nature of the visit. If the man has no definite project to work on and can concentrate on traveling around, a year is plenty of time. But if he is assigned to a specific task in addition to making a trip or two, up to 18 months might be needed to allow him to do both.

For Managers, Too: Research managers, as well as researchers themselves, can benefit from overseas trips, but their stays will differ from those of the researcher. Benedict suggests that the administrator consider making several shorter foreign trips, starting, say, with a large congress or trade fair for initial orientation. Subsequent trips can be planned on the basis of the contacts made.

Because he is concerned with research at a different level from that of the lab man, the research manager can best communicate with others of similar general outlook. If specialized information is desired, the researcher is likely the better man to send.

Turning the Tables: U.S. companies also play host to visiting researchers from abroad, giving them a taste of the American gift for group and applied work. Main benefits for the company are the establishment of international friendships that may lead to future cooperation.

The practice of hiring abroad and bringing researchers to the U.S. permanently is also carried on. However the hopes that U.S. firms may once have held for Europe as a relatively inexpensive source of highly trained personnel have now all but disappeared. Not only do foreign researchers resent the possibility that they might be exploited in any way, but nowadays transportation and legal costs may eat up any saving in salary. And, of course, once the man becomes a resident of this country, his salary will have to be competitive to keep him from being hired away by another company.

Main reason for looking for talent abroad is that certain countries may be stronger in specific areas than is the U.S. Some American firms, for instance are finding top-flight inorganic chemists hard to find here, are turning their attention to Europe for possible recruits.

In the Fold: Procedures of a couple of companies—Shell Development and Procter & Gamble—illustrate the setups of companies that swap with related laboratories.

Shell sends men from its Emeryville, Calif., research center to Shell labs in Amsterdam and the Hague. P&G has been swapping technical personnel with affiliated companies in other countries. Most of the exchange has been between the company's Cincinnati labs and the wholly owned subsidiary, Thomas Hedley & Co., Ltd. (Newcastle, England).

Shell has its people stay a year at a time; P&G has its people stay only six months or so, but its aim is largely just to strengthen internal communications. The men involved in P&G's exchange gain insight into how other technical units operate and they get to know others in the company working in similar areas.

Still building its research exchange program is Chemstrand. Its Research Center's Executive Director, David Chaney, tells CHEMICAL WEEK that the company's foreign operations generally "take care of themselves." Its U.S. researchers do go over as needed for better communications and to advise in special areas. Although Chemstrand has not yet brought any foreign researchers over for temporary stays, Chaney says that "this can be a stimulating association," and he notes that such a visit is in the works.

University Help: Trips and stays abroad by university people have been going on for years, but may get a new impetus from the NSF's new foreign office setup. Last fall, NSF started its first overseas office in Tokyo. The two representatives stationed there are charged with stepping up international flow of scientific information. Part of their function will be to aid in exchange of research personnel.

NSF has long sponsored trips for specific purposes on a research grant basis. A recent trip that may bear fruit for industry was made by Jackson Foster of the University of Texas at the request of the Japanese government. Jointly sponsored by NSF and the Microbial Chemistry Research

FILTER FABRIC QUIZ

How would you solve these filter fabric problems?

PROBLEM:

You're a soap manufacturer. You wish to filter foreign matter from oil and glycerin. What filter fabric would you use?

SOLUTION:

Closely woven cotton duck has withstood six months of this arduous service. For even longer life, nylon fabrics are recommended.

PROBLEM:

You're a dyestuffs manufacturer. You wish to separate a dye intermediate from a sulphuric and hydrochloric acid solution at 45°C. What filter fabric would you use?

SOLUTION:

A spun dynel fabric with high chemical resistance is both dependable and durable for this highly corrosive process.

PROBLEM:

You're a ceramics manufacturer. You wish to filter clay slurries. And the filter fabric must have good release characteristics and resist mildew and bacteria growth. What filter fabric would you use?

SOLUTION:

A tough fabric of filament nylon is sleek enough that the filter cake drops away at the touch of a scraper—and so durable that fabric life is multiplied many times.

PROBLEM:

You're a pigment processor. You wish to filter titanium dioxide from strong acid solutions with vacuum-type filters. What filter fabric would you use?

SOLUTION:

A fabric of filament Dacron*, highly resistant to mineral acids, provides smooth cake discharge and long service for maximum operating economy.

Each of these solutions is but one of many ways to solve these problems. For, as you know, countless factors help determine a filter fabric's performance—fiber, yarn, weave, count and finish, to name just a few. Selecting the most effective and economical filter fabric for a particular job is a very complex matter. And you need the assistance of a specialist—like the specialists who distribute Wellington Sears fabrics. These distributors are experts in the field of industrial fabrics—and always ready to lend a hand in helping solve your problems. For their names, and a free copy of our illustrated booklet, "Filter Fabric Facts," write Dept. M-3 today.

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Foundation (Tokyo), Foster toured Japan interviewing both academic and industrial microbiological researchers. His report on this significant field—in which the Japanese are particularly strong—will be published in the Journal of Applied Microbiology.

Personal View: A few personal insights into the reactions of a researcher who had spent a profitable stay in a foreign lab were given CHEMICAL WEEK by Charles Wharton, a researcher in physics and plasma diagnostics at University of California's Lawrence Radiation Laboratory. After a year at Germany's Max Planck Institute, Wharton feels that he gained a much more objective view of his work at home.

He particularly notes the importance of speaking the language of the country one is in. Most European researchers speak English, thus inducing the American visitor to carry on his daily work in English. However, Wharton feels that he was able to get much more from his German hosts by learning their language and using it, even though he had a hard time with the tongue.

Wharton says he believes that the best return will likely come to the man who is willing to investigate the speech, thought, politics and news of the country, in addition to its scientific work.

Other important points cited by Wharton are the difference in pace abroad and the role of the wife. The European pace is slower and more leisurely than the American; Wharton found more time for writing while abroad, is now coauthoring a book on plasma diagnostics. The researcher must be able to adapt to the pace—and if his wife is with him, she too must be willing to adjust to the foreign environment, or the man may not be able to take full advantage of his stay, Wharton says.

Bevy of Benefits: All in all, there are many advantages to be gained by the careful company.

Benedict sums up the benefits to be derived this way: "Opportunities for good relationships, purchase of patents, future cooperative international investments and matching of advantageous talents from the two continents are developing every day. Good relations on a scientific level can be instrumental in hastening this healthy development."

New Research Council

Improved private research and development in New Jersey is the aim of a new council of business, industrial and educational leaders formed by the State Dept. of Conservation and Economic Development.

Philip Kronowitt, vice-president and general manager of Toms River-Cincinnati Chemical Corp. (Toms River, N.J.), is chairman of the new group. Its plans include: survey the state's scientific manpower, improve technician training and postgraduate scientific curricula, upgrade the skill of the work force, publish an annual report of scientific progress in the state and evaluate government action in scientific fields.

A group with similar aims was recently formed in metropolitan Washington, D.C. (CW, Feb. 18, p. 142).

Low-Cost NMR Unit

Varian Associates (Palo Alto, Calif.) has introduced the first nuclear magnetic resonance (NMR) spectrometer designed for manufacture in sizable quantities.

The new unit, says Varian, is called the A-60, weighs about one-fourth as much as conventional NMR units, has about one-third the number of controls, costs about half as much (\$23,750) and can be run by technicians on a routine basis. Resolution of the system is one part in 100 million.

A number of the simplifications in the new spectrometer were made possible by limiting it to studies of proton spectra, which Varian says should cover most uses. However, larger machines will still be required for analyses using other nuclear species.

Isotopic Power

A power source operating on cesium-137 will be built by Royal Research Corp. (Hayward, Calif.), a subsidiary of Royal Industries, Inc. (Los Angeles). The Atomic Energy Commission is sponsoring the work with a \$130,000 contract. Goal is a prototype unit that will deliver 5 w. continuously for 10 years, to be ready by Dec. '61.

Expected to weigh 250-300 lbs. in a volume of 1 cu.ft., the unit will include a thermoelectric conversion

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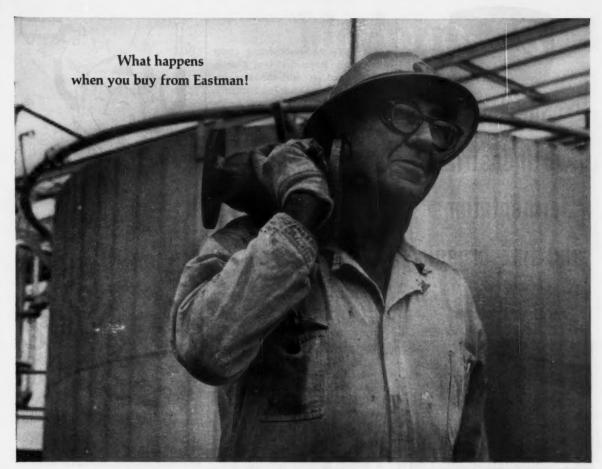
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Eastman



The case of the culprit catalyst

"The phone was ringing when I walked into the office on that Monday morning," mused one of our regional sales managers.

"The customer's greeting was rather cheerful considering the circumstances he then proceeded to relate.

"In his own words it went something like this: We have a new process technique out here, but we're not overly proud of it. We're making aluminum acetate...using as reactants your glacial acetic acid and one of our new aluminum storage tanks.'

"I was glad he still had a sense of humor but wished that I had taken the day's vacation, which was briefly considered late Sunday.

"Well, he went on to relate that their yields on a process (not the new one he had just mentioned) in which our acetic acid was one of the reactants had dropped off alarmingly. While checking out process controls and materials they found aluminum acetate in the acetic acid storage tank.

"Under the circumstances his conclusion that our acid contained a catalyst for the unwanted reaction seemed even to me a reasonable hypothesis.

"Arrangements were made to send a large sample to our Acid Division Control Laboratories for complete analysis, and I held my breath several days until the final report came in.

"A metal catalyst was present, but one that for a number of good reasons we avoid like the plague. Armed with the information that it was extremely unlikely that contamination occurred prior to unloading, we dispatched a technical service man to the customer's plant to help find out where it was coming from. "And with the aid of an improperly functioning check valve, he did. Seems that the acetic acid storage tank was connected directly to a reactor in which the metal catalyst was (as it should have been) present in salt form. Trace amounts were reaching the storage tank...and you know the rest.

"Fortunately, tank damage was not extensive, and by filtering, they were able to make use of the acid containing the aluminum acetate. After cleaning out the tank it was filled back up... with a new supply of our pure glacial acetic acid.

"Oh yes, a brand new check valve was installed, too,"

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device built by Westinghouse under subcontract. Royal says that a strontium-powered unit with the same output would weigh about 750 lbs. more.

Relatively low power density means that the device will not be applicable for space use; potential uses include powering undersea cables, remote weather stations and any type of remote telemetering facility.

EXPANSION

- Pennsalt Chemicals Corp. has moved its technical service groups to expanded laboratory facilities at the King of Prussia (Pa.) Industrial Park. The new building is a two-story, 31,000-sq.ft. laboratory, the first unit of a planned \$6-million technical center. A second unit will be started in mid-'61.
- Petro-Tex Chemical Co. has started construction of a \$300,000, two-story addition to its office and laboratory building in Houston. The addition, which will give the firm 44,000 sq.ft. of laboratory space, will be completed by Aug. 1, '61.
- Layne Associates (Memphis, Tenn.) is a new firm devoted to water treatment research.
- Scope, Inc. (10 Jefferson Ave., Woburn, Mass.) is a new developmental and consulting firm specializing in spectrochemical instrumentation.
- Stanford University has dedicated the John Stauffer Chemistry Building, an \$800,000 complex of advanced research laboratories that will be used largely for organic chemical research.
- Wallace & Tiernan Inc. has named Robert Conner as research director for its pharmaceutical divisions, Strasenburgh Laboratories (Rochester, N.Y.) and Maltbie Laboratories (Belleville, N.J.). Expansion is expected in both divisions with a \$1-million research budget expected for '61.
- Two new space research facilities have recently been announced.
 Bendix Systems Division (Ann Arbor, Mich.) is building a \$10-million vacuum test chamber for development, assembly and testing of complete spacecraft.

Convair San Diego has completed a materials and processes laboratory that will study all types of materials used in space vehicles.



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Calcium Carbide Pipeline Acetylene



Vinyl Resins Copolymers

Market Newsletter

CHEMICAL WEEK March 11, 1961 Output potential for phosphoric acid got a big lift this week, as three new units started up operations.

At its East St. Louis, Ill., works General Chemical Division of Allied started production of phosphoric acid from its newly completed plant. This unit, with a projected capacity of 50,000 tons/year of-wet process acid, will primarily supply fertilizer manufacturers in the Midwest agriculture region. Previously the company had been supplying a portion of its area's needs from its North Claymont, Del., plant.

Shakedown operations have been completed at the long-delayed, \$2-million phosphoric acid unit of Bunker Hill Co. at Kellogg, Ida. The 130-tons/day unit was completed in June '60, but a 7½-month strike delayed its startup (CW, Market Newsletter, Feb. 11).

Recently, Collier Carbon & Chemical Co. completed a \$225,000 anhydrous liquid phosphate unit at the Kellogg site, which will use the B-H acid as a raw material. Actually, Bunker Hill will utilize the plant to produce the anyhdrous liquid phosphate exclusively for Collier.

Also, 105% phosphoric acid is now being marketed from the newly completed Monsanto unit at Addyston, O. The new product, called Phospholeum, is expected to find outlets in surface-metal treatment and as a dehydrating agent in the plastics and petroleum industries. The new location will enable Monsanto to extend its phosphoric acid marketing area to the metal-treating industries of the Southeast.

Scotland's first polyester film plant went onstream late last week. The new unit, owned by Imperial Chemical Industries and located at Dumfries, Scotland, will have a capacity of greater than 2,000 tons/year. The plant is housed in a factory, which until three years ago was used for manufacture of protein fibers.

Isophthalic polyester capacity got a boost this week as Molded Fiber Glass Companies Inc. (Ashtabula, O.) put onstream a new, 5-million-lbs./year addition to its plant. MFG's polyester plant is specifically designed for isophthalic-based resin manufacture. The expansion brings total polyester capacity of the company to 10 million lbs./year. Isophthalic polyester markets have been growing rapidly during the past few years and are expected to triple by '65 (CW, March 4, p. 64).

Progil-Bayer-Ugine (PBU) has started up its new plant in France (at Pont-De-Chlaix near Grenoble) to produce isocyanates, polyethers and polyesters. The plant was built to supply the budding polyurethane industry in France. The company expects to be in full production by the end of the summer. PBU is a joint subsidiary of Farbenfabriken Bayer AG. and

Market

Newsletter

(Continued)

two French chemical companies, Progil S.A. and Societe D'electro Chemie D'electro-Metallurgie et Des Acieres Electriques.

Canada's first maleic anhydride plant was put onstream this week by Monsanto Canada Ltd. at Montreal. The unit, built primarily to supply domestic Canadian demand, is reported to have a rated capacity of 6 million lbs./year. During the past few years maleic anhydride demand in Canada has been growing rapidly, especially for polyester manufacture.

Last week's styrene monomer price cut of 10% by Koppers Co. was viewed as an effort by that firm to stabilize prices, which had become very unstable during the past few months. All the major styrene monomer producers plan to meet the new price schedule: rubber grade, 11 e/lb.; polymer grade, 13 e/lb., f.o.b. frt. equalized, c.l. quantities. Previously, the price tag was 12.59 e/lb. for the rubber grade and 14.5 e/lb. for the polymer grade, dlvd.

Stepped-up piggyback shipments of highway tank trailers are in the offing. The Pennsylvania Railroad and Du Pont are reportedly considering such moves, and other chemical shippers and railroads are likely to get in on these shipments.

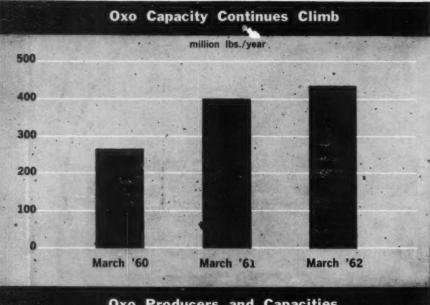
Monsanto Chemical Co. completed what many consider the first transport of chemicals via tank trailer on flat car last summer in early tests of the scheme with the Chicago & North Western Railroad. Later the Interstate Commerce Commission approved C&NW's plan, making it the first U.S. railway to win such authorization (CW, Sept. 10, '60, p. 46).

But CPI distribution men caution that piggyback movements are no cure-all to the high and rising costs of delivering finished goods to customers. And some railroad officials still doubt that conventional highway trailers are strong enough for the rigors of rail movements.

Higher prices are in store for sodium nitrite consumers. Solvay Process Division of Allied has posted new tags on spot and contract material, effective April 1. New quotes on carlot and truckload quantities: \$9.15/cwt., f.o.b. works, freight equalized.

First commercial prices were posted last week on Food Machinery and Chemical Corp.'s Oxiron series of epoxy resins, making them competitive with epichlorohydrin-based epoxies. New tags: Oxiron 2002, $60 \ensuremath{\psi}$ /lb. in carloads (drums); $70 \ensuremath{\psi}$ /lb., less than carloads (more than five drums); Oxiron 2001, $80 \ensuremath{\psi}$ /lb., c.l. and $85 \ensuremath{\psi}$ /lb. l.c.l.; Oxiron 2000, $65 \ensuremath{\psi}$ /lb., c.l. and $75 \ensuremath{\psi}$ /lb., l.c.l. Since their introduction last year the resins had been available at developmental prices of \$1.75-2.25/lb. Late last year the firm expanded its development unit at Baltimore, Md.





Oxo	Producers	and	Capacities

	(mi	Ilion Ibs./year)	
Producer	,	Capacity	Chemicals Produced
Amoco			MITTERACT
Wood River, III.		12	Iso-octyl alcohol Decyl alcohol
Esso			
Baton Rouge, La.		100	Iso-octyl alcohol Decyl alcohol Tridecyl alcohol
Gulf			
Port Arthur, Tex.		12	Iso-octyl alcohol
Philadelphia, Pa.		36	Decyl alcohol Iso-octyl alcohol Tridecyl alcohol
Oxo-Chemicals Co.	N. Sale		
Haverhill, O. (proposed)		36	Iso-octyl alcohol Decyl alcohol
Texas Eastman			
Longview, Tex.		120	Propionaldehyde n-Butyraldehyde Isobutyraldehyde n-Butanol Isobutyl alcohol
			Trimethyl pentanedio n-Butyronitrile Isobutyronitrile Acetonitrile
Union Carbide		A Lection	
Texas City, Tex.		120	Propionaldehyde Butanol
			Isobutanol Butyraldehyde Isobutyraldehyde Primary amyl alcohol
*			Decyl alcohol Primary amyl acetate
	1		Propionic acid Iso-decanoic acid
	Total	436	

Oxo Outlook:

This month Gulf Oil is placing onstream its new, 36-million-lbs./year oxo-chemicals plant at Philadelphia, bringing total current U.S. oxo capacity to 400 million lbs./year. And with at least one other new oxo plant definitely scheduled for construction, capacity will soon rise to 436 million lbs./year (table). This represents a whopping capacity buildup in the past 12 months-when the year-ago output potential was 264 million lbs./year (chart).

But consumption, while growing steadily, has hardly kept pace with expanding capacity. This fact, along with reports that new potential producers are scouting the field, leads to the conclusion that oxo chemicals* are in for a long period of serious overcapacity.

Most of the current oxo expansion is for the production of iso-octyl, decyl and tridecyl alcohols. Demand for these chemicals will expand during the next five years-from the present level of 125 million lbs./year to over 160 million lbs. by '65. But it's obvious this market growth will not be nearly enough to utilize existing and proposed capacity.

Admittedly, the actual capacity of any plant may vary considerably, depending on which products it makes. And if there is a switch in product line, capacity may change significantly.

Also, if "blocked out" operations are used (i.e., periodically switching from product to product and, in effect, making the process a batch-type operation), a loss of time-hence loss of capacity-may occur during transition periods.

More to Come: Nevertheless, no immediate relief appears in sight for alleviating the overcapacity problem. In fact, it may worsen since more expansion is on the way. Newly formed Oxo Chemicals Co., a jointly owned subsidiary of Amoco Chemicals Corp. (subsidiary of Standard Oil of Indiana) and Pittsburgh Coke & Chemical's

Oxo chemicals are compounds—mostly and higher alcohols—made by the so-ca "oxo" process. This process is a method converting—by reaction of carbon monos and hydrogen—olefin hydrocarbons into a hydes, then into alcohols.

Capacity Still Far Ahead of Demand

Pittsburgh Chemical Co. has disclosed plans to start construction of a plant this spring to produce iso-octyl and decyl alcohol (CW, Feb. 18, p. 33). The plant has an estimated capacity of 36 million lbs./year, will be built at Haverhill, O.

And the trade is constantly speculating on entry of other oxo producers—e.g., Monsanto and Jefferson Chemical. Although these firms admit to having studied the situation, none reports it's planning to start construction in the near future.

Meanwhile, further adding to oxo producers' concern is the broad range of straight-chain higher alcohols that will be available soon from Continental Oil's new plant at Lake Charles, La. These products, which are made by the so-called Ziegler-type Alfol process, could carve for themselves a large share of the market presently held by oxo alcohols. The new alcohols are said to display excellent performance in both plasticizer and detergent application.

In the face of such facts, oxo producers were queried by CHEMICAL WEEK to learn how they viewed the current capacity-demand situation. Although all agreed there was ample capacity to handle current demands, only one firm termed the situation "definite overcapacity," and all were optimistic about the future.

Amoco officials pointed out that its decision to participate in the joint venture with Pittsburgh Chemical was supported by long and careful study, not only of the over-all market picture for these alcohols but also of the company's specific marketing position. "We expect to be able to sell the output of this new plant profitably."

Industry observers believe that Amoco is currently purchasing sizable quantities of the C_8 and C_{10} alcohols for resale and that Pittsburgh Chemical will take half of the new plant's production for captive and sales purposes. Therefore, the Oxo Chemicals Co. venture appears to stand in a good position, regardless of the over-all supply and demand picture.

Gulf summed up its opinions in two words, "definite overcapacity." However, the company says that its decision to build a second plant was based on the belief that it could profitably sell the output and "this opinion has not changed since the initial decision was made."

Enjay, on the other hand, does not see the present situation as overcapacity, says only that "there is ample capacity to take care of all foreseeable demand." Union Carbide agrees. Eastman did not wish to comment on the over-all capacity - consumption gap either, said that its own capacity vs. sales and captive requirements was in good balance.

Because Carbide and Eastman have considerable flexibility in their operations, this could be the reason why they declined to comment on the overall situation. Unlike the petroleum companies involved in oxo chemicals, both Carbide and Eastman produce a broad spectrum of oxo compounds and derivatives.

During the past several years, these companies have been steadily increasing their captive requirements for, as well as sales of, these chemicals. Now they can juggle the production ratios of each of these compounds and thus minimize their current overcapacity situation. Even so, it's a good bet that neither producer is happy.

End-Use Patterns: Two major uses for oxo alcohols have received most of the attention recently—plasticizers and detergents. Outlets for plasticizers, which consumed over 100 million lbs. of the higher alcohols (iso-octyl and decyl) during '60, have been growing steadily during the past several years—at a rate of about 7%/year.

This outlet for oxo alcohols would normally be expected to continue to grow at the same rate along with the over-all expansion of plasticizer and polyvinyl chloride production. But now that Continental Oil's alcohols are about to enter the marketing scene, the future of plasticizers based on iso-octyl and 2-ethylhexyl alcohols is uncertain. Plasticizers made from Con-

tinental's straight-chain higher alcohols have reportedly displayed superior performance characteristics, compared with dioctyl phthalate—e.g., lower volatility, better low-temperature and compatability properties, and are expected to get a good chunk of the octyl and decyl plasticizer market.

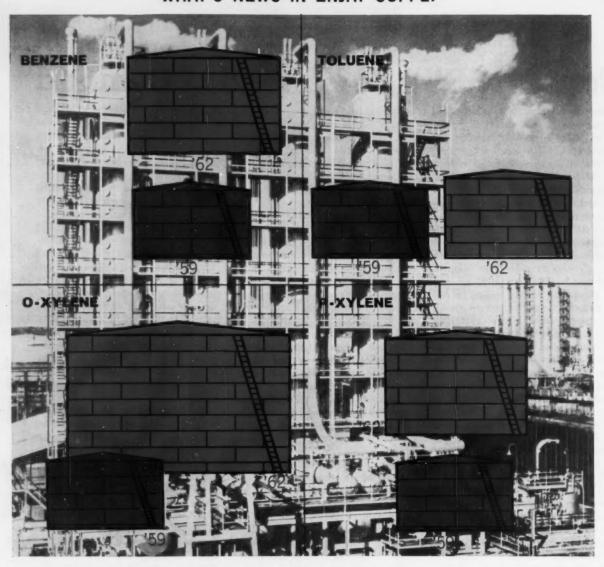
The major oxo alcohol-derived plasticizers on the market are dioctyl phthalate, diisodecyl phthalate and diiso-octyl phthalate. In addition tridecyl alcohol is starting to show promise as a plasticizer material because of its low volatility, which makes it particularly suitable in wire-coating applications. But even if tridecyl phthalate is able to capture a share of the wire-coating plasticizer market, it probably would be at the expense of dioctyl phthalate, and this would not alter the oxo-chemical supply and demand situation.

Detergent Market Dim: Detergents were once considered a promising new use for tridecyl alcohol. But the prospects for ethylene oxide-tridecyl alcohol adducts to become large-scale commercial products are now dim. The price of tridecyl, which is about 4¢/lb. above nonylphenol's, is the major hurdle. Although several companies have offered tridecyl alcohol surfactants for several years, this end-use for the alcohol has grown to only about 3 million lbs./year. By '65, however, this market could grow to 15 or more million lbs./year. But this growth is contingent upon the pricing strategy of Continental Oil with its Alfol alcohols.

Since a rapid growth of oxo chemicals is not foreseen, the unanswered question remains: Why the sudden burst of oxo expansion? There is no direct explanation. Each of the companies involved apparently feels it will be able to weather the overcapacity storm and sell its plant output.

And, of course, there's always the chance that some new big-volume outlets might develop. However, unless such new and sizable uses develop for oxo chemicals, a serious overcapacity situation is expected to exist for some time.

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PARAXYLENE million lb/yr	65	105			

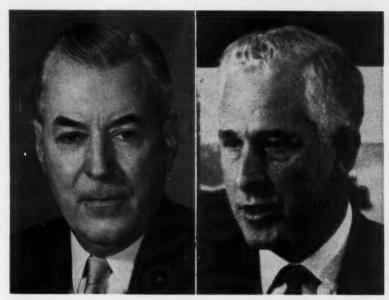
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UCC's Bergen, Du Pont's Stephens: Girding for big coolant fight.

Coolant Selling Warms Up

Antifreeze makers are right now winding up their marketing plans for the upcoming '61-'62 selling campaign. Planning has been complicated since last season by a new phase of competition—between one-season and multiseason products. Upshot: in '61-'62 most of the rivals for antifreeze business will offer both types of products and will be prepared to spur promotion of whichever type looks most promising. Result will be the most aggressive coolant selling season ever seen.

For most antifreeze marketers, the '60-'61 season was a good one. Despite a warm fall that retarded early sales, the harsh winter helped boost total antifreeze volume about 3-4%, to nearly 125 million gal. But the new premium-priced, long-life coolants didn't do very well. Most market observers now figure these new products did not take more than 4-4.5% of the market (some 5 million gal.).

Reaction to this rather disappointing start for the long-life products—at least by their sales managers—has been greater determination to make these products successful. But for the companies in general, the last season primarily showed the need for flexibility—such as provided by a product

line with an alcohol type of product, a one-season glycol type and a multiseason glycol coolant.

Looking at '60: Aside from pointing up the value of product line flexibility, the past season also revealed some other noteworthy facts. For instance, there was a leveling—perhaps even a slight decline—in the recent trend toward greater cash-and-carry sales by discount houses. Coolant marketers see this as an indication that car owners are putting more faith in garage and service-station operators—and such dealers will play a big role in urging wider use of multiseason products.

As to the relative positions of the major contenders for the antifreeze dollar, few significant changes were noted.

Observers figure that ethylene glycol antifreezes accounted for about 86-88% of last year's volume; methanol products slipped again, this time to about 8-9%; and the multiseason products took the rest.

Premiums Start Slowly: Because '60-'61 provided the first full test year for the new multiseason products, their performance was most closely observed. Their sales were admittedly not up to expectations.

Market penetration was less than half that which had been projected (estimates were for a 10-15% share of the market). Says one coolant marketing man: "As it turned out, we conducted several hundred market tests; we hardly had a true national sales program. But I think we've learned some things that will help us next year."

Main reasons for the slow start: both auto owners and dealers were confused about the new products, and consumers were scared off by higher prices of the new products. Dow and Du Pont began promoting their new entries (Dowgard and Telar) in late spring and summer, were joined later by Union Carbide, Phillips Petroleum and Sears, Roebuck, though these latter firms didn't match Dow's or Du Pont's huge ad budgets, estimated at \$5.5 million each.

Looking Ahead: Next fall's antifreeze and coolant campaign will be the most competitive one ever, most producers feel. Makers of the new type of products will vigorously go after a considerably larger share of the market than they got this year.

Their primary objective will be to dispel the confusion among jobbers, service-station dealers and consumers about their products. This will likely take the form of promotions aimed at winning the confidence of these groups, now that the first year's advertising blitz (Dow, Du Pont and Union Carbide together spent more than \$13-\$14 million on promotion last year) has caught their attention.

But marketers of conventional antifreezes-even in the same companies aren't likely to take this challenge passively; next year's sales effort is expected to be their best in a number of years. Particularly, the producers offering only one-season products will put on a big campaign. For example, General Aniline & Film Corp., which entered the antifreeze market rather late this year with its Ramp (ethylene glycol-based permanent antifreeze). doubtless will market aggressively to gain a strong position. Houston Chemical Corp. put on its strongest sales campaign last year, and it may surpass it this year. The other antifreeze marketers are sure to do like-

Coolant Strategy: But the dominant

theme of much of the new coolant makers' strategy will be flexibility. Carbide's R. P. Bergen says that UCC has not yet set its plans for next fall. But industry observers look for the firm to continue to bank on its conventional Prestone product, hold its new Long Life Coolant as a powerful hedge-just in case the company finds that the premium-priced products are beginning to catch on.

Du Pont's M. A. Stephens is also cautious about next year's plans, but the firm's flexibility stems from its having three types of product.

Most explicit about next year's marketing plans is Dow. And Garland G. Fritts, brand manager for Dowgard, says some extensive changes are on the way.

For one thing, Dow will present a broader, more flexible product line to the trade. In addition to extending the usable life of Dowgard Full-Fill Coolant to two years (from one), Dow will also sell a single-phase, ethylene glycol antifreeze next year under the Dowgard label (CW, Feb. 11, p. 73). The reason: to get some of the business that was lost last year, when consumers who were attracted by Dow's advertising later decided against a premium coolant in favor of the permanent antifreeze.

Dow will also offer Dowgard coolant in 55-gal. drums for the first time next year in trying to win a larger share of the auto and truck fleet coolant market.

And Dow will strenghten its jobberdealer relations for next year's effort. Some Dow sales staffers-who have been covering broad sales territorieswill aim at more-concentrated marketing areas; the full sales staff will be conducting a more intensified program of training sessions with jobbers this year.

Test Markets: Fritts also points out that Dow will continue its test marketing this year, to check on Dow's various promotional methods and combinations and to test selling techniques by service-station dealers.

Promotional emphasis will be somewhat different this year, too. Dow will concentrate more heavily on trade promotion, and will continue its fleet-testing and auto-racing activities,

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e.g., higher shipping costs, more difficult installation. But Dow figures that Dowgard's performance more than offsets these difficulties.

Staying Fluid: Coolant men are looking to the day when new autos will come off the assembly lines with long-lasting coolants already in the cooling systems, perhaps even in sealed systems. But coolant makers don't yet know when that development is likely to occur. They do know they must be ready to provide the products the public wants. (Right now, the lag in new-car sales—a prime market for the long-lasting coolants—hasn't given them any cause for cheer.)

Moreover, most coolant makers freely admit they are hard pressed to pinpoint the sales potential of their new products, must continue to evaluate this question to plan their marketing moves.

But these factors haven't basically discouraged antifreeze makers, who see a solid, expanding market for their products, once the confusing issues are settled. And until they are settled, flexibility is believed to be the success key.

Alcohol Muddle

Synthetic alcohol producers are this week mulling over the recent reports (CW Market Newsletter, March 4) that Publicker Industries, Inc.—which has made no comment on the matter—is once again trying to buy surplus corn from the U.S. Dept. of Agriculture at lower-than-support prices.

Their concern harks back to last year's worry whether Publicker was trying to buy enough corn to produce some 84 million gal. of industrial alcohols—nearly one-third of the total market. (CW Market Newsletter, April 30, '60).

At that time, the synthetic alcohol producers—fearing a sharp price drop—banded together to oppose any sale of corn to Publicker, the nation's largest fermentation alcohol producer. However, the deal reportedly fell through largely because Publicker shifted its sights to Cuban molasses. Washington observers felt at that time that Publicker's bid might have been successful if the company had persisted.

Molasses Troubles: Last year,

Publicker reports, it purchased 100 million gal. of Cuban molasses at 7¢/gal.—almost half the price now charged for Texas molasses.

But the break in diplomatic relations between the U.S. and Cuba and President Kennedy's public statement opposing any U.S. molasses purchases from Cuba may have caused Publicker to seek a new supply source.

What To Do: Synthetic alcohol producers are in something of a quandary over the muddled situation. Some say that they wouldn't object to Publicker's purchasing "very limited" quantities of corn to keep its plants operating, but that they would not stand by if large quantities of such corn-derived alcohol threatened to undercut their alcohol prices. But they are puzzled over how the government might limit any sale of corn to Publicker alone.

To make the situation even more nebulous for the synthetic producers, virtually nothing has been done officially on the matter, so they have little basis for taking any specific course. And some observers believe that Publicker's chances of actually getting surplus corn may be a lot better now than they were a year ago. That's because Publicker can now contend that its raw-material source has been cut off by virtue of U.S. government actions. Moreover, Publicker has made it known that it may have to lay off several thousand employees if it doesn't get material for its operation.

Contract Rate Defeat

Last week the Interstate Commerce Commission rejected a bid by the New York Central Railroad to set up an "incentive rate" system designed to gain new business for the railroad by providing lower rates for shippers.

The decision is the first to be handed down by ICC on a host of new incentive rate proposals by U.S. railroads intended to win back lost business. Observers view the decision as the death knell for virtually all kinds of incentive rate making—contract rates, "agreed" rates, and so-called guaranteed rates — proposed during the last two years.

Although the Central's proposed rate did not apply to a chemical commodity, some CPI traffic men hoped chemical products might eventually be covered by this type of rate.

In the Central proposal, rug manufacturers shipping products between Amsterdam, N.Y., and Chicago could get discount rates, provided they signed a contract (hence contract rates) to route at least 80% of their traffic over Central tracks. The Central had planned to offer similar rates on other commodities and over other areas.

Other Incentive Rates: Although the decision thwarts Central's bid. other railroads have similar proposals in the works and ICC will shortly consider another by the Minneapolis, St. Paul & Sault Ste. Marie (Soo Line) Railroad-considered the pioneer incentive rail rate proposal in this country.

The Soo Line has offered discount rates to shippers of steel pipe and fuel oil in its territories. In its plan, shippers need not sign contracts, but they must promise to ship a flat percentage of traffic over the railroad's tracks.

Incentive rates like those proposed in this country are used widely in ocean trade and in Canada and several European countries, with governmental approval. They had been opposed vigorously by American trucking groups, the American Waterway Operators, Inc., and others.

Behind the Decision: ICC, in an 8-2 vote, gave two reasons for deciding against the Central's contract rate plan: (1) it might easily spread to other forms of transportation and destroy the present freight rate structure; (2) it is unfair to some

ICC feels that if incentive rates were to spread to truckers and barge operators, it would accelerate "rate wars" and wreak havoc in the transportation industry.

On the question of fairness to shippers, the body believes that setting an 80% dividing line for the discounts is purely arbitrary, and that shippers who agreed to ship 100% of their traffic this way should perhaps be granted even larger discounts. Moreover, ICC figured that the 80% idea ignored the actual volume of product shipped and thereby gave undue advantage to small shippers.

Doubtless, chemical shippers will keep an eye on ICC's decision in the Soo case. And some traffic men believe one or more of the decisions may be appealed, later carried into the courts.

DATA DIGEST

· More Plastisols: Detailed booklet outlines formulations for highshear plastisol and organisol vinyl plastic compounds using new allpurpose, stir-in paste-grade resin. Marvinol Sales Promotion Dept., Naugatuck Chemical Division, U.S. Rubber Co. (Naugatuck, Conn.).

• New Products: Brochure lists new products in company's line of resins, epoxy hardeners, adhesives, polyester catalysts, glass fiber and other materials. Miller-Stephenson Chemical Co., Inc. (401 North Broad St., Philadelphia).

• Polypropylene: Technical sheet (No. 510) describes melt-flow characteristics of six grades of polypropylene. Cellulose Products Dept., Hercules Powder Co. (Wilmington,

- New Catalog: Booklet lists over 100 surfactants and specialty products, with chemical and physical descriptions, for industrial and textile uses. Applications and general use suggestions are included. Onyx Chemical Corp. (190 Warren St., Jersey City 2, N.J.).
- Fluorocarbon Specialties: New folder gives specifications for Pyrex pipe and flange gaskets, Tefloncovered steel and Pyrex-Teflon specialty items. Chem Flow Corp. (109 Paterson Ave., Little Falls, N.J.).
- Wax Specifications: Technical data sheets cite specifications for pure carnauba, candelilla and ouricury waxes based on prescribed sampling and test methods. American Wax Importers and Refiners Assn., Inc. (225 West 34th St., New York 1).
- Vinyl Resins: New booklet describes vinyl solution coating-formulation techniques, outlines general properties and uses, formulations and preparation of clear, as well as pigmented, coatings, and application methods. Tables list pigments and dyes suitable for tinting vinyl finishes. Union Carbide Plastics Co. (270 Park Ave., New York 17).
- Molding Materials: New booklet cites typical performance and property data for new family of styrene-based molding and extrusion materials, styrene-acrylonitrile copolymers and styrene-acrylonitrilebutadiene terpolymers. Dept. AI, Monsanto Chemical Co. (Springfield 2, Mass.).



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Who Gets the Last Word in Plant Design?

Production and maintenance men often grumble about how little weight their arguments seem to carry in the battle for more say in new plant design. To management caught in the middle, their claims—and designers' counterclaims (above)—have sometimes sounded like petty bickering. But if the current trend toward tighter plant design continues, the way in which top management settles this dispute could figure heavily in future profits.

Most companies still say that production and maintenance men have their say—although not always their way—at some point before it is too late to make design changes. Sagging profits and increased competition, however, makes it urgent that initial plant costs be cut to the minimum—and that could mean that production and maintenance will have their say, and their way, less frequently from now on.

As an engineer at one Midwest chemical company explains: "When profits are down, competition is rough, and winning a market depends on getting in fast with a low-cost plant; the design department should not be accountable to anyone. Production and maintenance always want

extras and special equipment that take time and money. Unless a case can be documented with clear-cut past failures, there is no reason for design to make changes."

Underdesign: Some company managements have already conceded the concept of so-called "underdesign"—i.e., cutting out the small design extras that production men have traditionally favored. These extras permit a plant to produce more than specified by initial design (CW, Jan. 23, p. 51).

One West Coast designer says, "We are saving considerably in initial plant cost. All it means is that production men will no longer find it easy to get pats on the back for boosting process capacity by 50 or 100%. The extra capacity just isn't sitting there in the initial design ready for the taking."

However, as much as operating departments may hate to lose hidden extra capacity, their major concern is something else: the effect tighter plant design may have on process downtime and maintenance costs. Some companies, for instance, are lowering initial plant costs by eliminating spare equipment used for stand-by, and taking calculated risks on less expensive materials of construction. Designers of one small process plant halved the initial cost—got into a market quickly, as well—by specifying untried wood tanks and plastic pipelines instead of service-tested Monel. After six months of operation, a process breakdown cost \$15,000. Operations complained, "If our recommendation to use Monel had been followed there would have been no breakdown."

But design replied: "It would take 10 similar breakdowns to eat up the savings resulting from the original minimum-cost design. By that time we might have lost our competitive edge. Then we would either want to build a new type of plant that would give us the edge, or get out of the market altogether. It's a calculated risk management had to be willing to take."

Until now, few designers have found the corporate climate favorable for calculated risks. Engineering only recently has reached the stage where many plants can be designed with the accuracy needed to pinpoint capacity; in the past, it was always safer to design-in extra capacity, just in case. And in the years of a rapidly expanding economy, management wasn't unhappy about the designed-in

extra capacity that helped fill customer orders.

With the slowdown in economic expansion, the corporate climate for taking calculated risks is beginning to change. (One designer doesn't just talk of "calculated" risk. His term: maximum risk.) Of course, with some companies now using computers to help establish design risks, it is easier to pinpoint the process conditions that have the best chance of success.

More Than Inheritance: Some engineers in production and maintenance willingly accept the calculated risk concept of plant design. But they feel they deserve a bigger say in the risk taking.

One firm proved on two recent calculated-risk projects that achieving minimum initial costs does not necessarily mean giving the whip hand to the designers. This company used a project team that included production and maintenance engineers. "We cut out the extras but did not jeopardize a smooth, low-cost startup. And maintenance and operating costs are not way out of line as they might have been if designers had had a free hand," says a member of one of the project teams.

However, if operating departments expect to increase their say in the calculated-risk designing, they may have to revise some of their traditional ideas. They must be more willing to take some operating risks—not those that compromise safety, of course, but those that may mean slightly higher operating costs. Maintenance must be willing to give up special equipment requirements that often mean the stocking of extra spare parts and higher inventory costs.

Production is familiar with the technique of upgrading a low-cost plant, making equipment improvements, adding spares that permit switch-over without process shutdown, when a critical unit must be taken out for repair. Companies have often used this method to keep capital costs down; the upgrading is a part of operating costs.

To upgrade while trying to hold operating costs down will be the big problem. In some cases, it may mean personnel upgrading. One West Coast firm explains the snag this way: "We will no longer take a man for production unless he has top college grades. But most top men either don't

have the personality requirements for production or are interested in going on for a Ph.D. This means we now have to look longer and harder to fill plant openings."

Management Choice: The decision on production's role in design clearly belongs to management. With small plants, once management has decided to take a calculated risk on low-cost design, it may be able to permit designers' decisions to rule.

In the design of a large plant, where the stakes are larger, management seems certain to give production a strong say. High startup and process downtime costs are risks that are often too great to take. But with the accent on lower initial costs, production and maintenance will have to be sharper, ready to take more risks than in the past.

EQUIPMENT

Process Heater: The Marquardt Corp. (16555 Saticoy St., Van Nuys, Calif.) is marketing a burner system for process heating that is based on a design originally used to simulate extreme ramjet and rocket operating environments. The unit, called a sudden-expansion burner, uses a highvelocity combustion technique to obtain high thermal capacity in a small, water- or air-cooled heater system. The unit can be operated over a 150-5600 F temperature range and at pressures up to 1,000 psi. Among the suggested applications: intermittent steam generation, partial oxidation reactions, liquid condensation, sound generation, air heating and high-temperature materials testing.

Electronic Cable: Haveg Industries' American Super-Temperature Wires subsidiary (Winooski, Vt.) now offers multiconductor cables for electronic circuitry with printed code numbers instead of color coding. A special fluorocarbon-resin ink is made a permanent part of the Teflon wire insulation by sintering. The company says that numbers, instead of complicated color coding, eliminate errors in circuitry hook-up and simplify circuit identification.

Plastic-Clad Steel: Lukens Steel Co. (Coatesville, Pa.) is now ready to begin production of plastic-clad steel that can be fabricated into process

equipment shapes for corrosive service

According to Lukens, it is able to coat the plastic, polyvinyl chloride, in ½-in. thickness on 1-in. steel plate. After coating, the plate can be bent and twisted for fabricating without trouble. A coating ½-in. thick on ¼-in. plate would probably be common for most service.

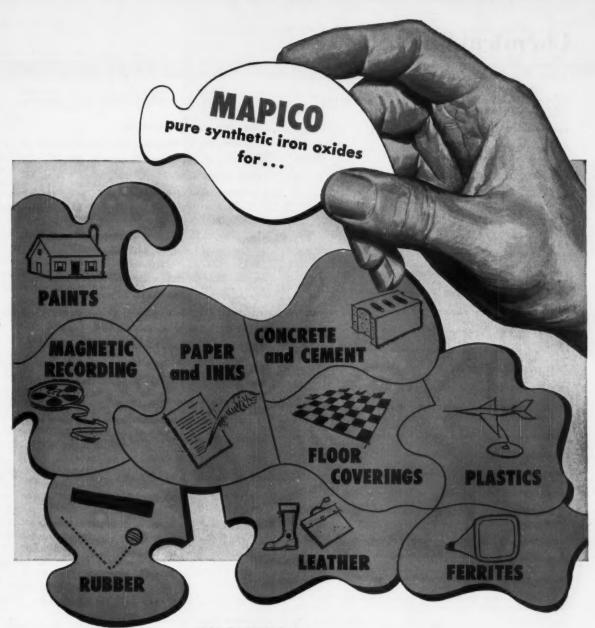
Until now, plastic-coated steel has been available only in sheet thickness, made by bonding a sheet of plastic to a finished sheet of steel. Thicker coatings have been sprayed onto steel at the job site after equipment fabrication.

In the Lukens process, the cladding is applied by dip coating. The steel is then fabricated; but if welding is required, the steel must be recoated at the weld spot.

Throttling Valve: Porter Engineering Co.'s (Hatfield, Pa.) new air-operated throttling valve has a Teflon diaphragm and a borosilicate-glass body, is suggested for handling all liquids except hydrofluoric acid and hot alkalis. Service conditions: 10 mm. Hg vacuum to 30 psi. at temperatures to 400 F. Sizes: 1, 1½ and 2 in. (straight-through and angle types).

Liquid-Level Switch: An ultrasonic liquid-level switch for level control, flow monitoring, mixing control, leak detection and warning operations is a new product of The Liquidometer Corp. (Long Island City 1, N. Y.). The switch is not influenced by liquid clinging to a sensing element, uses a dual-crystal design that responds to the presence of liquid only when there is a complete liquid path between sensing elements. The switch is accurate to $\pm \frac{1}{44}$ -in. Its probe temperature range is -195 to 250 C; control unit range is -65 to 100 C.

Kiln Pyrometer: Leeds & Northrup Co.'s (4901 Stenton Ave., Philadelphia 44) new Rayoscan System is a pivoting pyrometer for continuous scanning of the shell temperature of rotary kilns. The unit sounds a warning alarm before a hot-spot reaches the danger point, marks the location and shows the rate of change of the hot-spot temperature. The unit has a heat-radiation pyrometer, which pivots through an arc of 85 degrees as it



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Teflon Tubing: Westinghouse Electric Corp.'s Micarta Division (Hampton, S.C.) is offering a new chemical-resistant tubing with a Teflon inner lining bonded to an outer sleeve of Micarta laminate. It's called HY-380 tubing, can be used as bearings and bushings in addition to transfer of corrosive liquids. Sizes: 2 to 12 in. for inner diameter with wall thicknesses from 1/8 to 1 in. Maximum length: 2 ft. Users must supply the Teflon lining.

Plastic Tank: Justin Enterprises, Inc. (3755 Edwards Rd., Cincinnati 9) now offers as a stock item a 1,000-gal. processing tank of glass-reinforced polyester. The resin used for the tank is Atlas Powder's Atlac 382, bisphenol-A polyester. The tank is translucent, doesn't require a level gauge. It is 10 ft. long, 50 in. in diameter, has a wall thickness of ½ in., weighs 300 lbs. Price: about \$1,000.

Pneumatic Line Coupling: Daffin Corp.'s Fluidizer Division (Hopkins, Minn.) says its new coupling simplifies the joining of pneumatic lines including those on the arc of an elbow. Prime application: coupling sight-glass sections into lines. The coupling uses neoprene gaskets, is made of cast aluminum, is mounted with three cadmium-plated take-up bolts. Sizes: 1½ to 4 in.

Thermocouple Hotbox: Research, Inc.'s (Box 6164, Minneapolis 24) new Universal TC Hotbox joins all types of thermocouple wire directly to copper within its heat sink to eliminate the need for special plugs and compensators for a combination of thermocouple types. The hotbox accommodates as many as 51 pairs of thermocouple wires, controls junction temperatures at 150 F.

Cryogenic Pump: The Cosmodyne Corp. (12833 Simms Ave., Hawthorne, Calif.) is offering a new single-cylinder, high-pressure cryogenic pump for low and medium flow. The pump delivers liquefied gases at pressures up to 10,000 psi, and flows up to 4.65 gpm.

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Manual of Construction Management, For Chemical and Process Plant. National Schools of Construction. Publishers. Satsuma, Florida.

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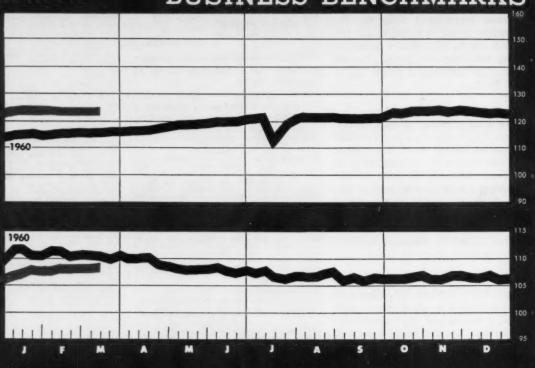
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Wented: Large volumes of ofcohols, acids, expensed and chlorinated solvents, ethylbenzene, apecial refinery streams, surplus chemicals. Established marketing organization with petroleum and chemical following requires sources of supply for spot and continuing sales. Refiners Petroleum Co., 332 S. Michigan Ave., Chicago 4, Illinois, HA 7-5425.

Surples Werted Chemicals, Phermecouticols, Oils, Acids, Plasticiers, Resims, Dyes, Solvents Pigments, Rec. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N.Y. HAnover 2-6970.

The Tracer Section con he used whenever you are looking for or offering Equipment. Plants Supplies, Chemicals, Opportunities, Special Services. The rates are low—just call or write Classified Advertising Division. Chemical Week, F.O.

BUSINESS BENCHMARKS



MARCH 11, 1961

WEEKLY BUSINESS INDICATORS	Latest Week		Preceding Week	Year Ago
Chemical Week output index (1957=100)	124.8		124.7	117.8
Chemical Week wholesale price index (1947=100)	109.0	1 10	108.9	111.4
Stock price index (12 firms, Standard & Poor's)	51.01	~	50.77	54.31
Steel ingot output (thousand tons)	1,582	717	1,582	2,690
Electric power (million kilowatt-hours)	14,239		14,315	14,200
Crude oil and condensate (daily av., thousand bbls.)	7,207	1	7,166	7,318
WHOLESALE PRICE INDICATORS (1947-49=100)	Latest Month		Preceding Month	Year Ago
All commodities (other than farm and foods)	128.1	1	127.9	128.8
Chemicals and allied products	110.4	1 1	110.4	109.9
Industrial chemicals	123.1	1.3	123.5	124.1
Paint and paint materials	121.8		120.9	119.1
Drugs, pharmaceuticals and cosmetics	94.3		94.3	93.8
Fats and oils (inedible)	50.1		48.5	49.2
Fertilizer and materials	112.2		111.9	108.8

CHEMICAL CUSTOMERS CLOSE-UP_





A Case for Quality!

It's NEW . . . it's UNIQUE! It's higher in strength, lighter in weight, easier to handle—and provides the best protection that reagent acids ever had. This distinctive shipping case of shock-absorbing expanded polystyrene is a development of Baker & Adamson packaging research. It provides superlative protection in shipping and storage, and is available only with B&A "C.P." Acids and Ammonia.

Enthusiastic reports from B&A "C.P." Acid users, large and small, point up such features as protection in transit... compact size... easier stockroom handling... simplified distribution to scattered locations.

When empty, these non-returnable polystyrene cases also offer interesting possibilities for use at home, in the labo-

> ratory, in many places. You'll be intrigued by the things you can do with them.

> Specify B&A "C.P." Acids on your next order and get the all-new, foam containers as a bonus!

The Finest
in Shipping Cases
Exclusive with the

Finest in "C.P." Acids

Safer! This new case cradles bottles in a formfitting polystyrene foam cushion that smothers shocks, prevents breakage. Meets the most stringent ICC requirements. Case is chemical and weather-resistant, too—ideal for outdoor storage.

Lighter! The polystyrene case is much lighter than old-style cases; weighs less than 11 lbs. with empty bottles. Easier to lift and move. Costs less to ship.

Easier to Handle! Convenient finger grips, light weight, and cube shape make the case easy to handle. Tops and bottoms interlock for safe stacking.

Order these B&A Reagents in the Case for Quality— Hydrochloric Acid, "C.P.", Reagent, ACS Nitric Acid, "C.P.", Reagent, ACS

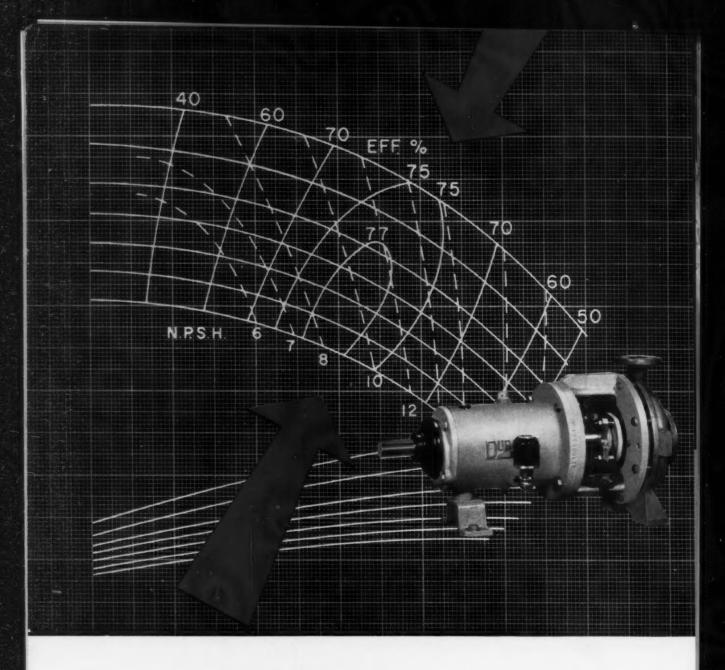
Sulfuric Acid, "C.P.", Reagent, ACS Ammonium Hydroxide, "C.P.", Reagent, ACS Acetic Acid, Glacial, 99.7%, Reagent, ACS

Also:

Nitric Acid, 40° Be., Technical Acetic Acid, Glacial, U.S.P. Perchloric Acid, 70%, Reagent, ACS Perchloric Acid, 60%, Reagent, ACS



GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.



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